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Introduction

Environmental quality is a relatively recent addition to the mainstream of planning activity; only since the early 1970s has concern over the environmental effects of both public and private actions been widespread. This issue of *carolina planning* features several articles that discuss how this environmental awareness has been translated into policy and planning practice at all levels of government, and also how environmental concern can be better directed in the future.

Maynard M. Hufschmidt, an internationally noted spokesman in the field of environmental planning, provides an overview and analysis of environmental policy and planning in the past decade. We are very proud to dedicate this issue of *carolina planning* to Dr. Hufschmidt. As a teacher, Professor Hufschmidt has been exceptionally generous with both his knowledge and his time; as a scholar, he has made significant contributions to the development of both federal and North Carolina environmental quality programs. This spring, Professor Hufschmidt retired from the Departments of City and Regional Planning and Environmental Sciences and Engineering, the University of North Carolina at Chapel Hill. In July, he joined the Environment Policy Institute at the East-West Center, Honolulu, Hawaii, as a Senior Fellow. Articles by Richard N.L. Andrews and Eric Hyman, who have studied with Dr. Hufschmidt, are also included in this issue.

The *carolina forum* features two pieces, one by a nationally known environmental researcher and the other by a practicing planner. *John Clark*, author of *The Sanibel Report* and Senior Associate with the Conservation Foundation, discusses current coastal management problems and argues for a comprehensive federal coastal policy. *Robert Bach*, a transportation planner, describes an innovative approach for integrating air quality and economic development interests through the Transportation Systems Management (TSM) planning process.

This issue marks the beginning of the fifth year of publication for *carolina planning*. We are now primarily supported by sales and subscription income, supplemented by a grant from the University of North Carolina at Chapel Hill. With this issue, we are experimenting with a different format in an attempt to moderate inflationary increases in production costs. As always, we welcome reader comments on both the design and content of *carolina planning*, and we count on your continued support for the magazine.

Catherine Morris and Ruth Ann Weidner

carolina planning

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Cover photo by John Marling shows an electric power generating plant on the North End of Tampa Bay.

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carolina planning welcomes submissions from our readers. Article-length manuscripts should be typed with a maximum of twenty double-spaced pages. *carolina forum* pieces report on interesting planning activities or present opinions on planning issues, and should be typed with a maximum of seven double-spaced pages.

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Contents

2 CAROLINA FORUM

8 LETTERS

9 ENVIRONMENTAL QUALITY AS A PLANNING OBJECTIVE: TRENDS SINCE 1970 — MAYNARD M. HUFSCHMIDT

Public awareness of environmental quality in the United States was originally rooted in aesthetic and ecological concerns. The author argues that the energy situation, an inflationary economy, and problems with environmental contamination have caused a shift in priorities. The emphasis is no longer on "clean-up for its own sake," but on health and safety as the most important environmental policy objectives.

16 FEDERAL ENVIRONMENTAL POLICY: PROGRESS AND PROSPECTS — RICHARD N.L. ANDREWS

Environmental policy in past decade focused on three major areas of activity: pollution control, environmental impacts of major public actions, and resource conflict. The author describes the progress made on these fronts during the 1970s, and suggests probable policy directions for the 1980s.

22 ECONOMIC INCENTIVES AND DISINCENTIVES: A NEW APPROACH TO FLOODPLAIN MANAGEMENT — ERIC L. HYMAN

Direct regulation is the common form of floodplain management. A mixed strategy, primarily relying on economic incentives and disincentives, may be more equitable, economically efficient, politically acceptable, and easy to administer.

26 NORTH CAROLINA'S GROWING PROBLEM — STEVEN P. FRENCH

The rapid development of North Carolina's floodplains has increased the possibility of flood-related property damage and loss of life. The author argues that the situation will worsen unless planners take action.

34 GROWTH MANAGEMENT THROUGH DRI REVIEW: LEARNING FROM THE FLORIDA EXPERIENCE — MARK D. HUNSBERGER

Review of Developments of Regional Impact (DRIs) is a relatively new growth management tool implemented, thus far, only in Florida. The strengths and weaknesses of the Florida approach are examined in order to suggest how planners might structure a successful DRI program.

42 THE SMALL-CITY TAXI INDUSTRY: POLICY OPTIONS FOR PRESERVING A THREATENED MOBILITY RESOURCE — ELIZABETH H. ELLIS

Taxicabs are frequently the only transportation available to low-income persons in small cities, and the industry is in trouble. Policy options for planners interested in maintaining the industry are discussed.

carolina forum

Downtown Revitalization vs. Air Quality: TSM to the Rescue in Louisville

Downtown revitalization has been an important concern of urban planning and development agencies for many years. Planners developed many such schemes in the 1950s, 1960s, and 1970s as business and residents alike fled the center city for the suburbs. Recently, air quality control agencies have also become concerned with downtown revitalization, but for different reasons. They fear that new development projects will attract large numbers of automobiles, thus aggravating the already high concentrations of pollutants generated by slow moving traffic on center city streets.

With downtown revitalization interests viewing new development as essential, and air quality interests viewing new development as a possible threat, the potential exists for conflict. In Louisville, Kentucky conflict has been reduced through a cooperative planning process for Transportation Systems Management (TSM) that will improve air quality and at the same time enhance the economic development potential of the center city.

BACKGROUND

In 1976, the Kentuckiana Regional Planning and Development Agency (KIPDA), the Metropolitan Planning Organization for a nine-county, bi-state region surrounding Louisville, began work on a Center City Transportation Planning Study. Conceived as a TSM study for downtown Louisville, the study was guided by a nineteen-member steering committee representing government on all levels (federal, state, regional, county, and city), transportation providers, the business community, and citizens' groups. A consultant was retained to help with the data collection and analysis. The project was funded with $71,500 in grants from the Federal Highway Administration, the Urban Mass Transit Administration, the Kentucky Department of Transportation, and the Louisville Community Development Cabinet.

The study resulted in a plan of twenty-two short-range (five years), low-cost transportation projects designed to improve air quality and also permit accomodation of several major development projects. The recommended improvements deal with transit service, transit marketing, traffic engineering, ridesharing, parking management, bicycle and pedestrian travel, goods delivery, work schedule changes, and vehicle emissions. The proposals include a system of elevated, climate-controlled walkways to facilitate pedestrian travel, a parking authority to coordinate parking policy with overall center city goals and objectives, a system of peripheral parking facilities for center city employees and other long-term parkers, mandatory vehicle emissions inspection and maintenance, and the introduction of some form of transit along all or part of River City Mall (an area now reserved for pedestrians).

The plan was evaluated using eleven criteria, including air quality and mobility. Figure 1 illustrates the impact that plan implementation is projected to have on center city carbon monoxide (CO), nitrogen oxide (NO_x), hydrocarbon (HC) emissions, and vehicle miles traveled (VMT):

FIGURE 1. PROJECTED IMPACT OF LOUISVILLE TRANSPORTATION PLAN

1982

	With No Transportation Improvements	With Center City Plan Implementation
CO	+26%	-23%
NO_x	+13%	- 4%
HC	-14%	-36%
VMT	+41%	+19%

These figures take into consideration twenty major development projects to be completed by 1982 and the vehicle emissions standards to be in effect at that time. Developments planned or under construction include a $90 million retail and office complex, a $24 million performing arts center, a $90 million apartment, hotel, and office complex, and a $26 million retail and office restoration project. As the chart illustrates, downtown Louisville can enjoy both air quality improvement and the proposed developments if the plan is implemented; both pollution reductions and VMT increases are possible through improved traffic flow and stricter vehicle emissions standards.

ELEMENTS OF THE PLANNING PROCESS

COMPUTER SIMULATIONS

The pollution estimates were developed with the SAPOLLUT computer model, which calculates gross emissions based on vehicle volumes and speeds. The more sophisticated APRAC 1-A defusion model was used to develop maps of the center city showing existing and projected "worst case" concentrations of CO. The APRAC model considers weather patterns and the height and arrangement of buildings as well as vehicle emissions. It is sensitive enough to reflect CO concentrations by block and is useful in relating localized impacts of TSM projects to attainment of federal ambient air quality standards for carbon monoxide.

CITIZEN PARTICIPATION

During the course of the study, a special effort was made to inform and involve the public. Press releases were periodically distributed to the media, including neighborhood newspapers. Presentations were made to, and comments solicited from, numerous neighborhood organizations and citizens' groups. A day-long public forum was held in the downtown Convention Center to present and receive comments on preliminary recommendations. Throughout the study, questionnaires were distributed, and citizen's comments noted. A summary of all public feedback was prepared and distributed to the steering committee before final recommendations were made.

LAND USE RECOMMENDATIONS

Between its inception in 1976 and final approval in 1978, the study went through several changes. Three land use plans and three interchangable transportation plans were initially proposed for a total of nine alternative plans. Early on in the planning process, however, the steering committee learned that center city land use issues would be resolved by the Mayor of Louisville, the Judge (chief executive officer) of Jefferson County, the Governor of Kentucky, the developers, and other "movers and shakers." While transportation and ease of access would presumably be considered, the land use decisions would hinge on factors outside the scope of the committee. The purpose of the study, therefore, would be to develop transportation solutions to minimize the adverse impacts of land use decisions made elsewhere.

To get a handle on these decisions, the steering committee consulted developers, elected officials, agency directors, and other knowledgeable sources. The end result was a map showing five-year land use projections for the center city. It was stressed that these were land use assumptions as opposed to land use recommendations.

Having to assume land use developments disappointed some steering committee members; they thought it would be useful to demonstrate that certain development sites were superior to others in terms of air quality. On the other hand, a ready-made land use scheme simplified work considerably. The steering committee would have had much difficulty in developing a set of unanimous land use recommendations, given representation of both air quality and redevelopment interests on the committee.

"DURING THE COURSE OF THE STUDY, A SPECIAL EFFORT WAS MADE TO INFORM AND INVOLVE THE PUBLIC."

TRANSPORTATION PROJECT PRIORITIES

Another change in the study occurred because of the consultant's recommendation to develop three alternative transportation plans: an auto-oriented plan, a transit-oriented plan, and a mixed auto-transit plan. After reviewing the plans, the steering committee felt the distinction between them was somewhat artificial and that all of the project proposals contained in the plans merited further analysis. The three plans were combined into a single core plan, and several other transportation projects were evaluated independently to determine if they should be included in the core plan. Following the evaluation, the core plan and the independent projects were combined into a single plan with two stages. Stage I projects were recommended for immediate implementation, while Stage II projects required additional study but were recommended for implementation by 1982.

IMPLEMENTATION

Because the implementing agencies were represented on the steering committee that developed the plan, most of the plan, which received final approval in 1978, is on the way to implementation. Agencies with different perspectives have compromised on transportation solutions mutually beneficial to their interest. For example, air quality control agencies as well as downtown revitalization advocates now support the concept of free, close-in, short-term parking for shoppers and other consumers of center city goods and services, if accompanied by an effective peripheral parking/ shuttle bus strategy to keep employees and other long-term parkers away from the street canyons and congested portion of the center city.

The Center City Plan was also incorporated into Kentucky's draft State Implementation Plan (SIP) to achieve federal air quality standards, along with commitments from local and state governments to implement the twenty-two project recommendations. Although downtown Louisville will not be in compliance with federal air quality standards by the 1982 deadline stipulated in the 1977 Clean Air Act Amendments, the improvements resulting from Center City Plan implementation should assist Louisville in qualifying for a five-year extension of the deadline.

Additionally, the committee planning process employed by the Center City Study was used to develop KIPDA's FY-1980 Transportation Systems Management Element (TSME) for the Louisville Urbanized Area. Previous TSMEs were primarily inventories of projects being developed by the implementing agencies. Kentucky's SIP, however, stipulates that alternative TSME plans be formulated and evaluated for their impacts on several criteria, including air quality. The most expedient and effective method of fulfilling this requirement was through the committee planning process used in the Center City Study.

KIPDA's FY-1980 Unified Planning Work Program contains funds for an update of the Center City Study; this indicates that the TSM planning process will continue to allow both air quality and downtown revitalization interests to initiate and pursue mutually beneficial transportation solutions for the improvement of downtown Louisville. Planners in other cities might try a similar planning process to coordinate both economic development and air quality activities.

Robert Bach
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Consider the Coast

The coast suffers all the problems typical of our country today and many that are unique. It has special resources but also special conflicts. It has inflation, unemployment, rising taxes, and crime; it also has hurricanes, beach erosion, estuarine pollution, and oil drilling. In the face of these and other coastal problems, federal policy is sadly lacking. Policy reforms and efficient resource programs are urgently needed to protect our fisheries, wetlands, estuaries, beaches, and barrier islands.

FISHERIES

Both commercial and recreational fishing will be endangered without immediate national attention. The majority of commercial fishing takes place close to the continental shelf or in shallow coastal bays. Many of the fish that do live in the ocean, such as salmon and striped bass, have critical breeding links to coastal estuaries or rivers. In these nursery areas, the young stages are especially vulnerable to pollution and habitat alteration. Therefore, the water quality and general condition of the coastal environment must be maintained in good condition.

Shellfisheries are particularly vulnerable to pollution. Because shellfish can take up human pathogens from sewage in the water--hepatitis, dysentery, and others--their catch in polluted waters is prohibited by state and federal health laws. While many shellfish areas are open and prospering at present, 15 million acres are closed to shellfishing. On the Atlantic Coast this amounts to 53 percent of all shellfish waters considered to be productive as well as vulnerable to pollution (such waters are classified as "under inventory").

The war against pollution is like the war against inflation--we seem never to gain on it, but only to reduce the rate of increase. In the late 60s we were closing waters at the rate of 1.3 percent per year, but by the mid-70s closings dropped to 0.6 percent per year. A more concerted effort on the part of the federal government is needed if we hope to maintain the present level of commercial fisheries.

Equally important are the sport fishermen who catch about as much each year as the commercial fishermen. The U.S. estimated annual sportfish take is 1.6 million pounds of fish caught by 20 million salt-water sportfishers. Sportfishing is not only a popular sport, it substantially boosts G.N.P.

Recreational fishing, such as surfcasting, is an important coastal use.

Photo courtesy N.C. Travel Development Bureau

While many states and the federal government may have interest in a single species, no workable program has yet been devised to protect sportfish habitats--a most important part of protecting the future coast. This is one area, however, where incidental gains are evident. Catches of many of our coastal sport species--e.g., bluefish, croaker, flounder, and seatrouts--were nose diving through the early 1960s, probably due to rampant coastal construction and uncontrolled pollution. Catches hit bottom in 1967, and then began edging up as environmental controls began to work. For example, an annual Environmental Protection Agency (EPA) survey of 144 estuaries showed that by 1976 DDT had almost disappeared from the bodies of fish and PCBs and dieldrin also were dropping.

RECREATION

Sportfishing, recreational boating, camping and nature study are only a few of the recreational diversions that our coastal resources offer, but the foremost recreation resource is the beach itself.

The lower forty-eight states have 27,000 miles of coastline suitable for recreation, of which 4,350 miles are sandy beaches. Gains in public beachfront have inched slowly ahead since 1960. Consider the Atlantic coast, for example: to a base of 336 miles of beachfront in 1960, we had added only sixty miles by 1974; but over the same fifteen years, private development exploded along the coastline, locking off thousands of miles of shoreline.

General growth of coastal communities--coastal sprawl--is probably the leading cause of diminishing access to beaches and waters. Large-scale condominium projects and private home development have caused heavy demand for bridges and causeways to open up new lands and have created a need for sewers and other capital items to service new communities. Carelessly planned, intense private use of land closes out the public and endangers coastal resources. Reserving beaches for the public has been ignored or aggressively obstructed by local governments, driving those denied beach rights into the courts where policy is being made by default. Federal and state action is the only hope.

Sprawl also encourages bulkheading, groins, and jetties that erode the beach because of a complex of physical reactions of waves to hard structures. The problem is greatly exacerbated by the slow and relentless rise of sea level throughout the world. The rate of rise on U.S. shores is about one foot in vertical height per century, which is no problem for Maine, but creeping disaster for the thin coasts to the south.

Erosion due to reckless development and natural forces is a serious and costly national problem. According to the Army Corps of Engineers, it will cost $743 million to protect the 1,100 mile coastline of the Northeast (Virginia to Maine), which was experiencing critical erosion in 1970. In view of the fact that the federal government is the undisputed owner of most of our beachfront, the main custodian of the adjacent waters, and does nearly all

major beachfront protection work, it is shocking that there is no federal policy dealing with beaches as a whole.

CRITICAL AREAS

A most important part of coastal planning is identifying critical areas that need special attention. For example, the barrier islands are on the critical areas list for many reasons. These long, narrow, sandy islands that fringe much of the Atlantic and Gulf coasts are unstable, ecologically vital, fragile, and the worst of the hurricane traps. Fortunately, the barrier island problem was formally recognized in 1977 when President Carter set up a task force to deal with the issue. Unfortunately, the task force ran aground for bureaucratic reasons and no action has yet been taken. Nevertheless, the campaign has heightened the public's awareness and alerted state agencies to the problem. The President's task force could improve further the prospects for a stronger national policy if it ever finishes its work.

Estuaries are on the critical list because of their biotic richness, their recreational importance, and their great vulnerability to pollution and physical disruption. These values can be disrupted when watersheds and river courses, which supply fresh water to the estuarine life, are altered. The quality of the river waters can be greatly affected by land uses in the watershed of the coastal shoreland, which can produce sediment from construction, natural soil erosion and fertilizer and pesticide runoff from cropland.

Because of the intractibility of local governments when it comes to effectively controlling land use, it does not appear that the federal government or the states will be able to get very far very fast in estuarine protection under the powers provided by the two principal control programs--the Coastal Zone Management Program and Section 208 (the regional planning provision of the Clean Water Act). For example, no federal or state program has been able to effectively resolve the problem of the buildup of huge superfarms on the low lying shorelands of North Carolina's Albemarle Sound. In any event, the gross misuses of the past will not be repeated as often and some improvement for the future coast may be expected through the heightening of public concern over soil erosion and other development induced non-point pollution.

Wetlands are also well-recognized nationally as vital areas. Their protection is well-advanced because they are defined as part of the public waters of the United States and because many states have risen to the challenge of protecting them. For instance, Georgia, which has 100,000 acres along the coast has permitted alteration of only twenty-three acres in ten years; and New Jersey's wetlands protection program brought losses down from 2,000 acres per year six years ago to less than eighty acres in the past few years. Any significant wetlands use now must have a federal permit from the Corps of Engineers, approved by Interior, Commerce, EPA and the state (often the states require a separate permit). In the future, coastal wetlands will no longer be converted wholesale to real estate. The future coast will, in all probability, have healthy wetlands, and those sacrificed will be lost only for the most necessary public purposes.

Boat slips are often created by dredging, which has adverse impacts on the coastal environment.

Photo by M. Fahay

THREATS TO CRITICAL AREAS

Industrial facilities siting poses a critical threat to all of these resources. The Department of the Interior (in the "National Environmental Pollution Study"--1969 statistics) estimated that there were 126,000 industrial plants in the U.S. coastal zone. Primary water users and potential polluters--paper, chemicals, hydrocarbons, metals --made up 4,500 of these. While EPA now regulates industrial discharges, no resources agency monitors EPA routinely to ensure that coastal resources are protected. EPA priorities are aligned with human health and the human milieu, not with resource conservation. The National Marine Fisheries Service (NMFS), a resources agency legally responsible

for review of EPA permits, has no personnel or money to do so.

The sticky problem of how to blend local rule with federal authority for energy facilities siting also is far from being resolved. For example, a long-term, large-scale controversy concerning a refinery at Portsmouth, Virginia, which involved all the federal, state, and local forces, was resolved by the Corps of Engineers. The Corps has taken on itself the power to evaluate all alternative sites while the Office of Coastal Zone Management stands by helplessly with no direct power. Policy guidance which could resolve such problems is badly needed from the federal government.

Oil drilling is another critical threat. It is, thankfully, moving outwards from the marshlands of Louisiana and the bays of Texas to ecologically safer off-shore sites. Yet refineries, and onshore support facilities for the booming offshore industry, are often thrown up recklessly, pushed by forces that overwhelm local planners and officials. Much of our offshore oil will be piped to shore from deep water platforms, thereby reducing the risk of tanker accidents; but our accelerating imports of oil and liquified natural gas present a strong threat to the future coast. There are now 12,000 spills per year reported to the U.S. Coast Guard, of which only twenty to twenty-five involve more than 100,000 gallons. Responsible operations and good housekeeping are needed to protect our valuable bird and fish resources and the amenity values of the coast. Slowly, international controls are improving the quality of crews as well as navigation and operation equipment, but much stronger federal initiative on controlling tankers is needed.

The conclusion that follows this survey of our coastal resources is obvious: there is no central federal policy or program in the most important problem areas--beaches, wetlands, estuaries, coastal fisheries, or barrier islands. The present policy framework is a patchwork of bits and pieces of legislation and regulation. States participating in the Federal Coastal Zone Management program have little effective policy guidance to assist them in framing coastal programs that are consistent with national needs. In my opinion, the most urgent policy needs include:

--*Beaches:* National policy is required to: 1) guarantee access to beaches for all Americans, 2) guide development along dangerous beachfronts, 3) govern Federal/state beach protection programs.

--*Wetlands:* National policy is required to protect the wetlands of the United States against all types of adverse use (not just dredging and filling as it now stands).

--*Estuaries:* National policy is needed to protect the rich resources of estuaries and territorial waters of the coast against pollution, physical alteration, and destruction of vital habitat.

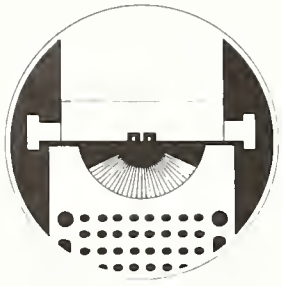
--*Barrier Islands:* National policy is needed to protect the fragile barrier islands of the coast from federally-sponsored development which destroys resources and endangers life and property.

--*Fisheries:* National policy is needed to conserve coastal fish and shellfish resources against environmental degradation and over-harvesting (present policy is related to U.S. and international waters only).

John Clark, Senior Associate and Director
Coastal Resources Program
The Conservation Foundation
Washington, D.C.

Valuable estuarine habitat is often lost due to drainage ditches.

Photo by M. Fahay



Letters

Mountain Highway

Thank you for giving our article, "Western North Carolina: Destruction or Protection?", such a prominent place in your fall 1978 issue of carolina planning. I do, however, have two clarifications to make. First of all, Alternative #8 of the proposed Corridor K superroutes through western North Carolina is not the least environmentally damaging but every bit as destructive as the rest. Second, the estimated cost of K through the mountains is a quarter of a billion dollars, not $25 billion.

With the U.S. Forest Service now calling for total abandonment of the remaining western North Carolina wilderness, only determined citizen action will prevent destructive projects like Super-K. People interested in preserving this wilderness resource should contact me through the Western North Carolina Mountain League, Box 128, Star Route, Bryson City, North Carolina 28713.

Carl A. Reiche, Coordinator
Western North Carolina Mountain League
Bryson City, North Carolina

Balanced Growth Update

Notable progress has been made on North Carolina's economic development policy since your last issue, which contained articles on balanced growth and industrial recruitment in the state. In March, the state legislature passed the Balanced Growth Policy Act, realizing Governor Hunt's proposals. The Interim Balanced Growth Board, composed of members of the Local Government Advocacy Council and the State Goals and Policies Board, now is considering criteria by which to designate growth centers across the state.

A number of troubling questions concerning the policy remain unresolved, particularly for local government officials who must decide whether to apply for growth center designation. Although designations may involve as many as 250 municipalities, no specific criteria have been established to guide allocations of funds to these centers. It is clearly possible that some designated growth centers will not receive special state assistance.

With no knowledge of how allocation decisions will be made and no guarantee of benefits, local governments must question the desirability of applying for growth center status. Fear of being denied future assistance may drive local governments to apply for designation even when they perceive no immediate benefits, or worse, when they prefer not to encourage further growth.

Local governments also must question the role to be played by existing local jurisdictions within urban clusters once they have been designated as growth centers; clusters may include several municipalities as well as areas outside municipal boundaries. Further, it is unclear how cooperation between local government units will be achieved in multicommunity centers.

Many local governments must consider, from a pragmatic standpoint, the fate of nondesignated areas. If declining communities do not meet criteria for designation, and are therefore denied some specific funds, the Balanced Growth Policy may ensure the continuation of their downward trend.

Some local government officials have expressed fear that the growth center system will become a political boondoggle, providing the Governor a vehicle to reward cities which cooperate with and support his administration. Furthermore, local areas may find themselves politically vulnerable with changes in administration. Such changes also cast doubt upon continuity within the policy.

The Balanced Growth Policy focuses primarily on increasing jobs through improved public infrastructure and active industrial recruitment. This fact raises concern among general-purpose government as to the state's commitment to invest in human resources. Investments in manpower programs and worker training, as well as in all levels of the educational system, are urgently needed in many areas of the state.

Finally, these concerns of local governments clearly illustrate the need for improved communications between the state and local leveles of government. A means should be developed for local governments to have more meaningful input into the policy and its implementation.

JoAnn Luehring, student
Department of City and Regional Planning
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Maynard M. Hufschmidt

Environmental Quality as a Planning Objective: Trends since 1970

Following World War II, a national consensus emerged in the United States on the objectives of full employment and economic growth--objectives which, along with national security, were to dominate national policy for the next twenty years. By the early 1960s, great progress had been made in achieving these goals. Overall, unemployment rates were low, real per-capita income had shown steady increases, prices were stable, and the Cold War crisis had abated. The very success in achieving economic growth and stability objectives led the Nation to turn attention to other pressing domestic issues. Two of these assumed great importance--the "war on poverty" and environmental quality; along with Vietnam, these issues dominated United States policy in the Johnson and first Nixon administrations. Both the war on poverty and Vietnam issues reached their peak in the late 1960s and were already on the decline in importance when the issue of environmental quality rose to national importance in 1970.

In a paper published in 1971, this author (Hufschmidt, 1971:231) raised a number of issues: "If, indeed, environmental quality is to be a major objective of national policy, how is it to be properly coordinated with other important elements of public policy involving economic and social goals? How are the broad, general statements of environmental quality contained in the legislation to be translated into specific objectives that can provide the basis for realistic and effective policies, plans, and action programs? How can performance of policies and programs be measured in terms of achieving specific objectives? And, most important, how can we evaluate the reciprocal effects of programs serving environmental quality and those serving other public policy objectives?"

In the same paper, this author (Hufschmidt, 1971:232) asserted that the national goal of environmental quality must be considered along with "national goals for economic growth, employment, economic stability, equitable distribution of income and opportunity, and public health and safety." It is instructive to look at the experience of the past eight years to find out what has happened to the national concern for environmental quality that was so strong in 1971, and to learn how environmental quality programs and activities have fared in the presence of other, often conflicting, national objectives and programs.

MAJOR TRENDS SINCE 1970

In the United States, the years 1970-1972 represented the full flowering of the environmental quality movement. At the national level, the National Environmental Policy Act (1970), which created the White House-level Council on Environmental Quality, the 1970 Clean Air Act amendments, the establishment in late 1970 of the Environmental Protection Agency, and the 1972 amendments to the Federal Water Pollution Control Act represented major initiatives in policy and program. Actions followed rapidly at the state government level; many states made important organizational, program, and policy changes in response to the national government initiatives (Parker, 1975).

It is important to note that the public pressure for environmental improvement in the United States, and the developed nations generally, was not primarily a public health concern in the direct sense of water-borne or

Maynard M. Hufschmidt retired this spring as Professor, the Department of City and Regional Planning and the Department of Environmental Sciences and Engineering, the University of North Carolina at Chapel Hill. He will be a Senior Fellow with the Environment and Policy Institute at the East-West Center, Honolulu, Hawaii, beginning in July.

Concern for environmental aesthetics marked the early days of the environmental movement.

air-borne disease vectors. In the water quality field, for example, U.S. national water pollution control programs were transferred from the U.S. Public Health Service as early as 1965, presumably because the important water quality problems were ecological and aesthetic rather than health-related. Although the primary ambient air quality standards authorized in the Clean Air Act amendments of 1970 were based upon health criteria, the basic policy emphasis at the time was cleanup for its own sake, using public health as an important legal justification. This conclusion is supported by the fact that administration of the Clean Air Act (as well as of other environmental quality programs) was removed from the Department of Health, Education and Welfare and placed in the newly established Environmental Protection Agency. In effect, the national health agency was left without any major environmental health programs.

EARLY EMPHASES

Much of the original thrust of the environmental quality movement derived from the ecological and natural systems orientation of the movement's leaders. One only needs to recall the popular impact of writers such as Rachel Carson *(Silent Spring)* and others to appreciate this important impetus. Accordingly, much of the national and international environmental policy and legislation in the period 1970-1973 had a strong natural system orientation (Caldwell, 1975). Certainly, this was true of the U.S. National Environmental Policy Act, with its requirements for environmental impact statements, and the Federal Water Pollution Control Act amendments of 1972, which called for a "zero-discharge" goal to be attained by 1985.

The natural system approach is reflected to some extent in the programs of other developed nations and in the establishment of the United Nations Environmental Program. During this period, the primary emphasis was on the ill effects of human rape of the environment rather than on the direct health effects on humans of environmental degradation perpetrated by humans as well as by nature. Of course, public health remained as an important consideration, but it was not the primary policy thrust in the developed nations.

A CHANGE IN PERSPECTIVE

It was too much to expect that the very strong emphasis placed by Congress on environmental quality in 1970-72 would continue without major challenge, especially when the significant economic and social costs of major improvements in environmental quality became evident.

ENERGY

The first challenge to the environmental quality movement came with the energy crisis of late 1973. This crisis brought home to both the developed and developing nations the key role played by energy in development and environmental quality. The challenges arising from increasing dependence on foreign sources of energy, especially petroleum, in a period of rising energy costs also became apparent.

In some countries, specific environmental quality goals had to be adjusted to meet the new realities. The drive for a greater degree of energy self-sufficiency, which the United States and other nations have adopted, involves substantial short-term environmental quality costs; in the United States, for example, fuel use at some electric power plants was shifted from natural gas and petroleum to coal at the expense of short-term air quality goals. Other environmental costs include land degradation from strip-mining, risk of oil spills from offshore petroleum production, and problems of safe radioactive waste management from nuclear power production. Energy conservation and greater emphasis on solar, wind, geothermal, and biomass energy sources are mitigating factors, but, at least in the short term, the pressure for greater

self-sufficiency by nations may well have adverse consequences on environmental quality objectives.

Faced with increasing difficulties in meeting environmental quality goals, policy-makers in the United States have reassessed priorities, and are now emphasizing environmental health and safety as important policy guides. For example, health and safety are becoming the dominant factors, along with economic cost, governing the choice between nuclear and fossil-fuel electric power generating plants and the location of such plants.

RECESSION AND INFLATION

The second challenge to the environmental quality movement, almost coterminous with the first, was the economic recession along with high rates of inflation that began in 1974. This "stagflation," which was accompanied by unacceptably high levels of unemployment and sharp increases in the cost of living in the United States, raised the issue of possible adverse economic effects of specific environmental quality programs and activities. All proposed regulatory actions of the Environmental Protection Agency were closely analyzed by the Office of Management and Budget for possible adverse employment and/or inflationary effects. It is fair to conclude that the recession-inflation had a dampening effect on environmental quality as a national policy both in the United States and in other developed countries. This was true in spite of considerable evidence that, on the whole, environmental quality programs had a positive effect on employment and had negligible adverse consequences on economic growth and inflation (CEQ, 1976).

This economic challenge to the environmental quality programs forced supporters of the programs to re-emphasize environmental health as a vital policy tool. This is especially true in the case of air pollution where adverse health effects of high pollution levels have been demonstrated, but it is also true in water pollution and solid wastes. In the final analysis, when regulatory actions are challenged either administratively or judicially, the environmental health argument is the single most effective rationale to support the position of the environmental quality agency.

"...THE PUBLIC PRESSURE FOR ENVIRONMENTAL IMPROVEMENT IN THE UNITED STATES, AND THE DEVELOPED NATIONS GENERALLY, WAS NOT PRIMARILY A PUBLIC HEALTH CONCERN..."

ENVIRONMENTAL CONTAMINATION

In contrast to these challenges, an important impetus for environmental quality

Wildlife protection was another important focus of the early environmental movement.

programs in the United States arose from direct threats to the public due to environmental contamination incidents: these include the discovery of carcinogens in New Orleans' water supply and asbestos fibers in Duluth's water supply. These events helped speed the enactment of the Safe Drinking Water Act of December 1974, which, for the first time, provided national authority over virtually all public water supplies throughout the country. Significantly, administration of this health-related program was placed in EPA.

Even more significant have been the threats to environmental health arising from the increasingly large number and volume of toxic chemicals used throughout the economy. Major episodes such as the Kepone disaster in Hopewell, Virginia, are symptomatic of a larger and more pervasive problem typified by our growing dependence on chemicals. After years of discussion, the U.S. Congress enacted a Toxic Substances Control Act which took effect on January 1, 1977. This law, which regulates industrial chemicals and chemical products, complements existing laws controlling discharge of chemical wastes into the air and water, and also complements statutes regulating use of synthetic chemicals in pesticides, drugs, and foods. The major purpose of this legislation is environmental health, and it is clear that the emphasis in EPA programs has moved steadily and significantly since 1971 in the direction of environmental health. Furthermore, recent emphasis on toxic and carcinogenic chemicals is quite different and far more complex than the prevailing concern of the 1950s--biological pathogens.

The cause of environmental quality has been strengthened by environmental contamination.

OCCUPATIONAL HEALTH

Along with the growing concern for environmental contamination, increasing attention is being given in the United States to occupational health. Although a comprehensive Occupational Safety and Health Act was enacted in 1970, progress was slow at first in establishing criteria and enacting standards governing work-place hazards, including hazardous pollutants. Now, the Occupational Safety and Health Administration in the Labor Department, the National Institute for Occupational Safety and Health, and the Environmental Protection Agency are cooperating in pressing for improved standards and performance in environmental safety and health in the work-place, the home, and the outside environment.

"...THE MOST IMPORTANT COMPONENT-OBJECTIVE OF ENVIRONMENTAL QUALITY IS THAT OF HEALTH AND SAFETY."

In summary, the major trends since 1970 have been in the direction of recognizing, first, that environmental quality programs would have to be adapted to the realities of other governmental goals including employment, economic stability, and energy conservation, and, second, that the most important component-objective of environmental quality is that of health and safety.

THE INSTITUTIONAL AND POLICY FRAMEWORK

Considerable progress has been made since 1970 in meeting some very ambitious environmental quality objectives, especially as expressed in the air and water quality legislation. Of course, there have been difficulties, serious delays, and even failures, and the efforts have been costly and often wasteful. It is instructive to look briefly at the framework of institutions and policies to discover how specific elements in the framework have contributed to, or detracted from, success of environmental policies and programs.

ENACTMENT OF NEPA

First, of crucial importance was the enactment of the National Environmental Policy Act, signed on January 1, 1970. This Act clearly and unequivocally established environmental quality as a major national policy objective, and provided the basis for a number of judicial interpretations of environmental

A secondary function of the EPA is research and grant administration.

legislation since 1970. The Act also established the requirement that all federal government agencies prepare environmental impact statements on any proposed major action that significantly affects the environment. This requirement, along with liberal provisions for citizen court suits against executive agencies, provided environmentalists and public interest groups with a major tool to force government agencies to take better account of environmental quality values in their planning and decision-making. Finally, the Act established a Council on Environmental Quality (CEQ) in the Executive Office of the President to advise the President on environmental quality problems and issues. The CEQ was charged with preparing the Annual Report on Environmental Quality to be submitted to the President and to Congress. There was an expectation that the Council would play a major role as adviser to the President on environmental quality matters, much as the Council of Economic Advisers has done on economic policy for the past thirty years. This would have required the Council to have direct input at the highest levels in the White House on important budgetary, policy, and legislative issues, including preparation of the Annual Budget and legislative program. In actuality, the Council's role during the period 1970-1976 did not live up to these high expectations, primarily because the Council did not have easy access to the President during the Nixon and Ford administrations. CEQ has been extremely useful, nonetheless, as a focal point for elaborating environmental problems and issues at the highest level of government.

"THE MOST IMPORTANT SINGLE STEP TOWARD PROMOTING ENVIRONMENTAL QUALITY WAS THE ESTABLISHMENT OF THE ENVIRONMENTAL PROTECTION AGENCY."

ESTABLISHMENT OF EPA

The second major institutional change was the establishment in late 1970 of the Environmental Protection Agency (EPA) as an independent unit of government concerned solely with promoting environmental quality. The EPA is primarily a regulatory agency and secondarily a research and grant administering agency. As Congress has enacted new and revised environmental legislation--on solid wastes, pesticides, toxic substances, noise, and community water supply--it has placed increasing administrative responsibility with EPA. It appears that the decision to bring together the major environmental protection programs under one agency (with the exception of occupational safety and health) is an enduring one, at least for the foreseeable future.

It is not surprising that EPA has not been fully successful in carrying out the ambitious agenda of programs that Congress has assigned to it. Based on the specific objectives, programs, and timetables established in the Clean Air Act of 1970, the Federal Water Pollution Control Act of 1972, and other legislation, EPA has fallen far short. Thus in 1977, Congress found it necessary to extend deadlines and relax some requirements in both the air and water quality programs. In part, the goals and timetables of the original legislation were too ambitious; in part, the Nixon and Ford administrations did not provide EPA with adequate resources to do the job; in part, administrative inefficiency was to blame.

In retrospect, it seems clear that the single administrative agency approach is an

important factor contributing to progress on environmental quality, regardless of the specific successes or failures of the EPA. The EPA as an independent agency, rather than as a subordinate unit in a larger department such as Interior, is and promises to be an effective spokesman for environmental quality.

EMERGENCE OF PUBLIC-INTEREST GROUPS

Finally, the emergence of effective non-governmental environmental interest groups, with the right to sue government administrators for non-performance or unsatisfactory performance, has been important in promoting environmental policy goals. To some degree, these interest groups have served to counteract the influence of powerful special interest groups, including business and industry associations that favor economic development and oppose strict environmental controls. Environmental interest groups, such as the Sierra Club, the Natural Resources Defense Council, and the Environmental Defense Fund, have been very effective via court action in supporting strong environmental control actions by EPA and in opposing inaction or weak compromises by EPA and other government agencies.

CONCLUSION

The major trends in national environmental quality policies and programs can be summarized as follows:

Economic challenges to environmental programs have forced a re-emphasis on public health.

The de-emphasis of environmental health as an objective of environmental programs, which was associated with the shift in the late 1960s and early 1970s of environmental quality activities from the Public Health Service to the EPA, appears to have been reversed. Environmental health as currently reinterpreted includes safeguards from toxic materials, hazardous substances, and occupational hazards; environmental health has now also come to be a major, and perhaps the single most important, objective of the national environmental programs.

The single-minded concentration on environmental quality characterizing environmental legislation and policies of the early 1970s has evolved into a more balanced consideration of national objectives of employment, economic growth, economic stability, equity, and energy self-sufficiency. This has been reflected in recent revisions of air and water quality legislation. Given the competing pressures, this balance was inevitable and is not necessarily in opposition to achieving long-run environmental quality objectives. An important consequence is that the national government has given greater emphasis to environmental health as a vital element in environmental quality programs, in part because of the increased recognition of health and safety threats from the environment and in part because health and safety are the most legally powerful justifications for environmental programs.

"...SUPPORT OF INFLUENTIAL PUBLIC INTEREST GROUPS IS NECESSARY IF REASONABLE PROGRESS IS TO BE MADE ON ENVIRONMENTAL QUALITY GOALS."

Adoption of a national policy statement on environmental quality and creation of the Council on Environmental Quality were crucial first steps toward focusing national attention on environmental problems and issues. They are seen as necessary but far from sufficient actions. In particular, the Council on Environmental Quality has not been used fully by the White House as a spokesman for environmental quality. The effectiveness of a top-level agency of this type depends primarily on how the highest level policy-makers choose to use its services. It is not yet clear to what extent the Council will fulfill this role in the Carter Administration.

The most important single step toward promoting environmental quality was the establishment of the Environmental Protection Agency. The key element here was the bringing together

Public health and safety are of major concern to environmental planning. *Photo by M. Fahay*

over the past seven years of all major environmental protection authorities into a single independent agency with direct access to the Chief Executive. In spite of the inadequacies of the EPA performance, it is hard to see how performance would have been as good under a fragmented administrative structure.

Consistent and strong public support of environmental quality programs, including the monitoring activities of environmental interest groups, has also been an important factor in the success of environmental programs. Given the reluctance and even opposition by industry and pro-development groups toward action on environmental improvements, the support of influential public interest groups is necessary if reasonable progress is to be made on environmental quality goals. Support of public groups can be mobilized most readily for issues where environmental health and safety are critical factors.

The national environmental quality objective has successfully met its first test--that of survival. In the "mid-course corrections" of both the air and water quality programs as reflected by the 1977 Clean Air Act and Clean Water Act revisions, the programs were continued and in some ways strengthened. Most of the unrealistic expectations of the early 1970s have been abandoned or modified. A deeper appreciation of the difficulties of achieving environmental quality goals along with other equally legitimate national goals has led to a revision of expectations. Within a more realistic policy framework, one can expect in the next decade steady if not spectacular improvement in the quality of the nation's environment.

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Federal Environmental Policy: Progress and Prospects

Ten years ago, U.S. Senator Henry Jackson of Washington introduced a bill to establish a "national environmental policy" for the American nation. An amended version of that bill was eventually passed, with almost unanimous support, and signed into law by the President on New Year's Day of 1970--New Year's Day of what the President chose to call the "environmental decade" of the 1970s--New Year's Day of the decade in which, the President said, it was "literally now or never" to clean up the damage caused to the human environment by industrial civilization. The law was the National Environmental Policy Act: best known, perhaps, for its creation of "environmental impact statements," but also a broad and forceful declaration of congressional policy to maintain and enhance the quality of humans' natural environment.

We stand now, in 1979, in the final year of that decade. It seems worth taking stock, therefore, of what progress has been made in that decade and what priorities seem appropriate for the future.

THE POLICY AGENDA: THREE FRONTS

The environmental policy agenda of a decade ago included three major elements--three "fronts," as I called them at the time (Andrews, 1971). The first was pollution control. Air and water pollution had been concerns of the federal government since the 1950s, but existing policies were an ineffective patchwork of fragmented administration, rigid uniform standards, construction grants for municipal waste treatment facilities, and hopelessly cumbersome enforcement proceedings. Most ambient standards were to be set by the states; the federal government took only a modest research role in such problems as solid waste management and recycling, noise, and the discharge of toxic materials. In 1970, public concern was beginning to be aroused by problems such as the Santa Barbara channel oil spill, the burning of the Cuyahoga River, and the image of a "dying" Lake Erie.

The first front dealt primarily with the control of environmental pollution from private and nonfederal sources. The second, in contrast, concerned the adverse environmental impacts of major public actions. At least nine federal agencies had major engineering missions affecting the physical environment, and by the late 1960s conflicts were evident between these and other agencies whose missions were to preserve existing environmental conditions and amenities. Moreover, institutional mechanisms for coordinating and resolving such conflicts were inadequate. Such issues were not all new--antecedents included such celebrated controversies as the Hetch Hetchy Dam authorized for the valley adjacent to Yosemite in 1913, and the Echo Park Dam in Utah defeated by the Sierra Club in 1954--but by the late 1960s a broader and more effective public constituency mobilized to oppose large federally-sponsored environmental modification projects. The Storm King Mountain Pumped Storage project, Tocks Island Dam, Cross Florida Barge Canal, several highway projects, and nuclear power plants in general are examples of projects that generated opposition.

The principal policy instrument of the second front was the National Environmental Policy Act of 1969 (NEPA). NEPA stated a national environmental policy, established a series of procedural requirements to insure its implementation, and created a Council on Environmental Quality to oversee environmental

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policy issues facing the nation. The most forceful clause of the law was its requirement of a detailed statement of environmental impacts to accompany every major federal action, which was in practice subject to review, comment, and litigation by other agencies as well as by interest groups and individuals.

Finally, the third front involved problems of resource conflict. It included a wide range of issues, such as wilderness and endangered species preservation, park and recreation planning, highway beautification, and land development controls. These issues were linked by their common conflict between market and nonmarket values of environmental resources. Various policies had been created--the Wilderness Act, Wild and Scenic Rivers Act, Water Resources Planning Act of 1965, Land and Water Conservation Act, and billboard control provisions, to name a few--but these were piecemeal actions, frequently ineffective and usually limited to a few uniquely valuable areas. Third-front policies recognized conflicting environmental values, and they added new authorities and programs. Like the policies of the first front, and of the second before NEPA, the policies of the third front failed to provide a coherent framework for focusing and resolving conflicts over the competing values of environmental resources

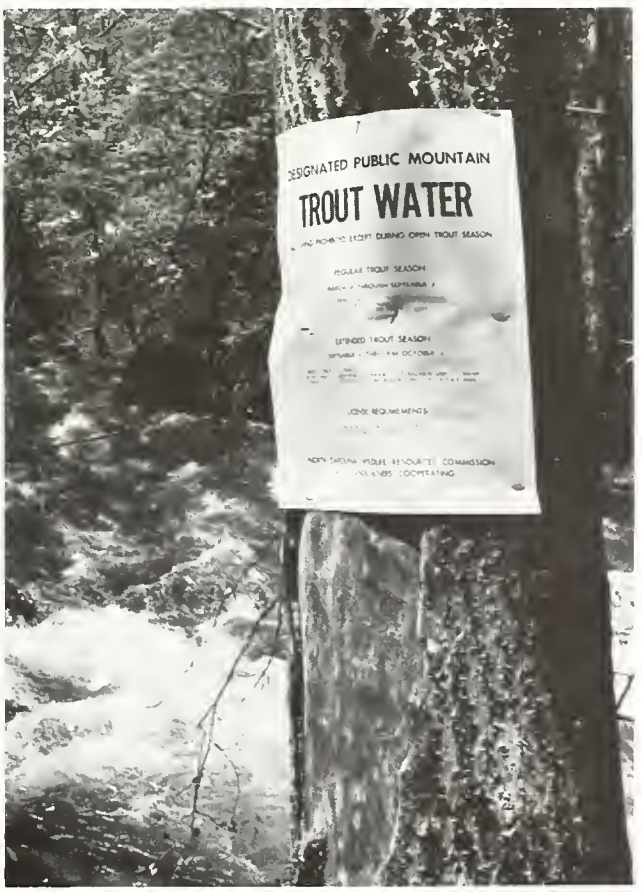
PROGRESS

How far have we come in the environmental decade since 1969? The record is voluminous in quantity but uneven in quality. Clearly, environmental policies of all sorts have become a major sector of the governmental agenda, whether measured by the number of laws and regulations, by the presence of administrative agencies and manpower, or simply by budget allocations. It was not the short-term fad many thought it to be at the time. It was instead a serious and lasting shift in the mixture of policy outputs Americans wanted from their government, and surveys have confirmed continuing public support of environmental quality programs (Mitchell, 1978). What those programs have actually achieved, however, is still less effective and more piecemeal than was hoped.

POLLUTION CONTROL

On the pollution front, progress includes dramatic increases in federal regulatory and budget authority, and reorganization of pollution control programs into a single Environmental Protection Agency (EPA). Federal "primary" standards for ambient air and drinking water quality, based on health criteria, now set a floor under state standards, but permit states to set more stringent standards. Environmental standards now extend to more pollutants than before: regulatory authority has been added, for instance, for toxic substances (the Toxic Substances Control Act), pesticides (the Federal Insecticide, Fungicide, and Rodenticide Act), and product noise; the Clean Air Act of 1970 and the Clean Water Act Amendments of 1972 authorize the EPA to require "best practicable" and "best available" technologies for pollution control; and a National Pollution Discharge Elimination System requires permits for all new point sources of water pollution discharge. Significant degradation of relatively unpolluted regions is now forbidden, and areawide water quality management plans are required in order to stimulate consideration of interjurisdictional problems and non-point water pollution sources. Funding also has been increased more than tenfold, at least in nominal terms;since 1972 the federal government has spent billions on municipal waste treatment plants alone, making the program one of the most expensive public-works construction efforts in American history. Federal grants are also available for planning and constructing solid waste resource recovery and recycling systems.

This apparent progress is mitigated, however, by several considerations both of effec-



Federal law now prohibits degradation of relatively pristine areas.

Photo N.C. Dept. of Nat. Res. and Comm. Dev.

tiveness and of cost. Some policies have been amended to stretch out compliance deadlines, including motor vehicle emission controls. Others have not been fully funded, leaving EPA without sufficient resources to enforce fully the policies on paper. Still others lack sufficient statutory authority for effective management: in some places, for instance, nonpoint sources are more significant sources of water pollution than point sources, yet agencies can only effectively control the point sources. Pesticide control laws, too, place the primary burden of proof on the agency to justify control or withdrawal rather than on the applicant to prove environmental safety before use. Even waste treatment construction grants have been accused of subsidizing increased pollution, of generating urban and industrial development rather than simply improving water quality.

The cost of pollution control has also become a media issue. Even though the total annual cost of pollution control is a small fraction of total GNP--less than five percent--EPA is now under heavy attack for the allegedly inflationary effects of its regulations. It is true, however, that present laws do not provide for some strategies that might be more cost-effective--such as control of nonpoint sources, and in some cases, perhaps, charges per unit of effluent discharged--and administrative barriers may prevent others, such as coordination of water quality management by EPA with water flow management by the Corps of Engineers and Soil Conservation Service. Some statutory objectives of pollution control policy may even be unreasonable in principle, such as the goal of "no discharge" of pollution by 1985.

In short, in the past decade pollution control has become a major governmental activity and has resulted in an extensive system of regulations and infrastructure. While it has almost certainly provided cleaner air and water than we would otherwise be experiencing, it has in no sense achieved the final cleanup the President seemed to envision in 1970. Pollution control is currently under serious counterattack for a mixture of real and imagined shortcomings. Additionally, new problems are even now being identified over which no effective social control exists, such as the indiscriminate dumping of hazardous wastes.

ENVIRONMENTAL IMPACTS

Environmental impact assessment has brought unprecedented progress to the analysis and

Non-point source pollution often results from agricultural activity.

Photo courtesy N.C. Department of Natural Resources and Community Development

review of government projects, permits, and grant decisions, though less for basic programmatic decisions. Within agencies, where information was once limited to feasibility and justification, information about environmental consequences is now routinely generated

"THE MOST SIGNIFICANT ENVIRONMENTAL PROBLEMS DO NOT USUALLY CONCERN ONLY INDIVIDUAL PROJECTS..."

as major action proposals are developed and evaluated. Outside the originating agency, through the required Environmental Impact Statement (EIS) review process, units of government at all levels now have a much earlier and fuller understanding of what each is proposing to do. In North Carolina, for instance, state officials reported as early as 1972 that EIS review gave them (for the first time) a early warning system for federal proposals that might affect state responsibilities (Hufschmidt, 1974). Outside the government structure, impact statements gave potential victims of proposed actions a new and powerful tool for discovering and debating the actions. Other powerful testimonies to impact statement value are that nearly half the states and numerous foreign nations have since adopted similar requirements, and that the impact statement concept has been emulated in other subject areas--inflation impact statements, minority impacts, national security impacts, and so on.

These achievements were not costless, and many criticisms of EISs have been expressed and debated. Some of these are that they are costly, gather too much data, don't affect many decisions, and encourage political stalemate rather than effective administration. These criticisms have been answered by proponents of the EIS process. First of all, long-term costs and data needs are integral to responsible planning, and in any case are far less than the cost of bad decisions. Second, while EISs explicitly modify only a small number of actions, many more actions are either stopped or modified earlier in their development under threat of EIS review. Finally, most would agree that democratic pluralism is worth some extra administrative cost.

Two larger deficiencies of the EIS process remain, however. The first is a failure to insure comparable assessment of major ongoing programs. The most significant environmental problems do not usually concern only individual projects, such as dams, highway links, or waste treatment permits, but also involve fundamental patterns of human activity driven by whole programs and production patterns. The EIS, keyed to specific action proposals, largely fails to touch these enduring programmatic forces; it may influence some decisions on new individual proposals but leave untouched the mandates that gave rise to them. The EIS process lends itself better, unfortunately, to reconsidering large but localized actions rather than those that are dispersed but collectively important.

Second, impact statement procedures have created a valuable procedural vehicle for disputing proposed actions, but have not provided a clear substantive vehicle for resolving such disputes (Andrews, 1976). An imbalance in information has been redressed, and an imbalance in political momentum altered somewhat; but a change in priorities, including such basic environmental policy areas as energy use and urbanization patterns, cannot easily be shown. Nowhere is this clearer than in foreign assistance, where the consequences of U.S. actions are far more critical to human well-being than are many domestic projects. Not until 1979 did the President finally affirm the applicability of NEPA's requirements in foreign assistance, and then only in a narrow definition that excludes socioeconomic implications.

In short, impact assessment has proven to be an unexpectedly effective innovation both as an administrative procedure and as a conceptual model for more responsible planning. Like pollution control, however, it too is under attack for allegedly contributing to inflation. It can also be trivialized, both by agencies substituting paper production for analysis and by groups using it tactically to fight small battles at the expense of more basic priorities.

RESOURCE CONFLICTS

Perhaps some of the most significant progress, albeit still in a fragmented pattern, has come on the third front. Efforts to pass a National Land Use Policy Act failed, as did similar state efforts, but many of its central principles have been enacted in other statutes. The Coastal Zone Management Act of 1972, for instance, provides incentives for state coastal land planning. Regulatory authority over pollution provided for in the Clean Air and Clean Water Acts gives powerful instruments to guide land use from a perspective of environmental impacts. Three broad new statutes, the Resources Planning Act, National Forest Management Act, and the Public Lands Policy and Management Act of 1976, guide the management of public domain lands. Fisheries management within 200 miles of the U.S. coast is provided by the Fisheries Conservation and Management Act of 1976; endangered wildlife and plants

Improper deforestation practices can lead to soil erosion and sedimentation problems.

Photo courtesy U.S. Forest Service

are protected by the Endangered Species Act of 1973 and the Marine Mammal Protection Act.

Laws by themselves do not, of course, guarantee implementation, and clearly the evidence is not yet in on the practical effectiveness of many of these policies. Moreover, problems equally serious or more so remain unaddressed; examples include overcommitment of western water supplies, groundwater drawdown, and the large-scale loss of agricultural lands and wetlands. The mere passage of these laws, however, signifies major progress in establishing explicit environmental protection policies. Additionally, the political dynamics surrounding the policies have shown the presence of an effective and persistent environmental protection constituency which has also achieved state-level victories. In 1976, for instance, Michigan voters passed a nonreturnable bottle ban by a two to one margin in spite of a multi-million dollar oppositional advertising campaign financed by the beverage container industry; in 1978, California voters approved a major water quality bond issue that appeared on the same ballot with the Proposition 13 tax cut initiative. Clearly, environmental quality is alive and well as a policy issue with the general public, despite propaganda to the contrary by some industries and agencies. There is, moreover, much yet that needs to be done.

PRIORITIES

In 1972,political scientist Anthony Downs asserted that political issues in America follow a predictable pattern. The issue rises suddenly to public attention and concern, declines as people begin to see the issue as conflicting with other values and goals, and finally comes to rest at a stable level of attention that is higher than the original level but far lower than its apex. Downs (1972) predicted that environmental issues would follow more or less the same cycle.

The "environmental decade" is now ending, and both its history and current events suggest that environmental policy has become a more persistent subject of public attention than was once expected by Downs and others. Some modification of early legislation has occurred, but hardly enough to suggest that support for environmental policy is fading. Even under intense lobbying, for instance, only minor weakening amendments have been passed to such laws as NEPA, the Clean Air and Clean Water Acts, and the Endangered Species Act. Furthermore, additional environmental legislation has been passed as recently as 1978 to expand the national park system, to tighten environmental controls on offshore oil drilling and strip mining, to promote energy conservation and solar energy development, and to triple federal funding for control of toxic substances (Environmental Study Conference, 1978). In the Executive Branch, too, both the Forest Service and the Bureau of Land Management are reviewing their lands for potential wilderness designations. The environmental decade may be ending, and some specific issues changing, but environmental policy continues both to attract a strong level of public attention and support and to grow and adapt in response to new priorities within the environmental policy domain.

Some of the immediate priorities for environmental policymaking are relatively predictable since many are already on the political agenda. The indiscriminate dumping of hazardous wastes has attracted increasing public concern, as it poses direct threats to human health as well as to other species; legislation to strengthen controls on these practices is scheduled for consideration in 1979. Preservation of wilderness, wildlife, and natural park lands in Alaska has been accomplished by Executive order, but this too is an issue for legislative action in 1979. Finally, the reauthorization of the Endangered Species Act is an issue as appropriation authorizations for the Act will expire early next year unless extended.

For the longer term, however, fundamentally important policy issues remain either inadequately resolved or in some cases unaddressed.

Some of these are at a global scale; as we in the United States worry about the price of gasoline, other nations are running out of such basic resources as food and firewood; and as deforestation progresses, it leads predictably

"WE CAN PREDICT THAT MAJOR ADJUSTMENTS IN MAN-ENVIRONMENT RELATIONS ARE LIKELY TO OCCUR."

to destruction of soil fertility, reduction of food crops, soil erosion and river sedimentation, and increasing human poverty and malnutrition (Eckholm, 1976). Within the United States, vast amounts of both money and legislation have been poured into the "energy crisis," but little effective change has yet occurred: the rate of increase of demand has slowed, and some increase in research and development on alternative fuels has occurred, but extraordinarily little planning has been done--even by planning researchers, let alone by government agencies--for dealing with the American environment in a future where fuels will be either economically or even physically scarce. We can predict that major adjustments in man-environment relations are likely to occur, some new, but others perhaps replicating problems we have faced in the past. These problems include water scarcities (especially in the arid west), accelerated harvesting of forests, perhaps soil losses in the plains and midwest, human hardship and perhaps changes in urban form and property values to minimize energy costs.

THE PLANNER'S ROLE

While specific issues may be speculative, the basic framework of environmental policy needs is now clear enough--barring a major war or other catastrophe--to permit far more energetic and imaginative response by planners than is now occurring. As Maynard Hufschmidt has noted,environmental quality is directly related not only to amenity and natural ecological values but also to economic growth and to public health and safety (Hufschmidt, 1971). It is imperative, therefore, that planners recognize and plan for these needs in relation to all their activities and communities. Most of the problems discussed in this article will directly concern professional planners for the foreseeable future. The sooner planners intensify their involvement with them, the greater their opportunity to plan for them rather than merely react to them.

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Economic Incentives and Disincentives: A New Approach to Floodplain Management

Floods are a serious problem in the United States and, to date, most floodplain management programs have been failures. Despite a massive attack on the problem by various levels of government, floods are inflicting larger total and per capita losses than ever before. Average annual property losses due to flooding exceed two billion dollars (White et al., 1973:3).

The floodplain is generally defined as the area of land that would be inundated by the worst flooding likely to occur in a hundred year period. Approximately 9.5% of all cultivable land, and 16.5% of all urban land, in the United States lies within a floodplain (Maddock, 1977:44). Furthermore, urban development encroaches on 1.5% to 2.5% of the total floodplain area in this country each year, even though much of this new development gains no special benefit from a floodplain location. In order to control further losses from flooding, land use management would have to prevent 80-90% of the uneconomic part of this expansion (White et al., 1973:xviii).

Public action in the management of floodplain use is necessary in order to protect the public health, safety, and welfare. Most importantly, floodplains are hazardous areas in which to live, and occupants impose costs upon themselves through the risk of death, injury, dislocation, and loss of property. In many instances occupants are aware of the risks involved with locating in a floodplain; however, new buyers, renters, and other temporary residents may be unaware of the risks if not warned of the hazard.

Floodplain management is also important because of the spillover costs, direct and indirect, which development of these areas imposes on society as a whole. Direct costs are imposed as paving increases the amount of impervious surface, thereby preventing infiltration of water into the soil. Buildings, roads, dikes, and levees, which may block flows or end up as debris, add to flood heights, velocity, and erosive scouring. Fires, explosions, and pollution may result from breached containment of industrial chemicals stored or used in floodplains.

The indirect spillover costs include the costs of warning systems, evacuation, relief, rehabilitation, and flood control structures. Public utilities and services may need special protection against floods and taxpayers who reside in the larger political entity, of which the floodplains may be only a part, may have to pay a portion of the extra costs. Costs are also imposed on friends, relatives, taxpayers, and charitable donors who provide aid to flood victims.

A third concern in floodplain management is that floodplains are often sensitive environmental areas serving vital ecosystem functions. They include estuaries, marshes, aquifer recharge areas, flats, or dunes. In addition, floodplains are often associated with scenic, wildlife, and recreational amenities requiring buffer zones for protection. Tight alluvial soils created by river floodwaters are poor sites for disposal of wastes, either in septic tanks or industrial waste containers.

TECHNIQUES FOR FLOODPLAIN MANAGEMENT

In the past, most floodplain management efforts have been *structure oriented*. The Army Corps of Engineers, alone, spends $500 million a year in capital costs for the construction of flood control structures; that figure does not include operation and maintenance costs for previously built projects (Kusler, 1976:1). Such structures are expensive, disrupt the environment, are rarely paid for by beneficiaries, and often provide only limited protection while encouraging further floodplain encroachment. Flood control dams have not been successful in preventing the increase in flood damage. In recognition of this failure, the Water Resources Management Act of 1974 gave the Corps of Engineers authority to

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include non-structural alternatives in their flood control strategies.

Some state and local governments have turned to *direct regulation* of land use in the floodplains in an attempt to reduce flood losses. These methods, which include zoning, subdivision controls, building codes, and designation of critical environmental areas, have, for the most part, also proven ineffective. The laws are often weak, and enabling legislation frequently contains clauses that make it difficult to remove existing uses. Strict regulation will be most effective in the long run by reaching the root of the problem--the encroachment of more and more of the floodplain by intensive uses.

Given the inadequacies of structural and regulatory techniques, a new approach based on economic incentives and disincentives may be preferable. A system of taxes or subsidies can be prepared that would limit development to desirable activities without prohibiting it altogether. The economic approach ensures that those who reap the benefits of floodplain development bear the risks and social costs of using that land. This alternative, which is more efficient, equitable, and effective than direct regulation, has been virtually ignored in the literature of floodplain management. It has, however, been successfully applied in controlling water pollution in Germany, and has been proposed for limiting sulfur emissions by major air pollution sources in the United States.

This paper will focus on the elements of effective floodplain management. Since other researchers have dealt with the problems associated with structural control measures (James, 1968; Kusler, 1976; United States General Accounting Office, 1975; White et al., 1975), I will emphasize the relative merits and disadvantages of direct regulation vis à vis the economic approach to floodplain management.

THE OBJECTIVES OF FLOODPLAIN MANAGEMENT

Kusler (1976:110-113) identifies a number of desirable characteristics for a successful floodplain management program:

1. avoidance of losses to existing uses;
2. avoidance of losses to future uses;
3. congruence with the characteristics of the natural and social systems of the specific area;
4. consideration of regional welfare objectives;
5. minimal environmental impact;
6. permanency of protection;
7. inherent safety;
8. feasibility of implementation;
9. inexpensive to formulate and operate;
10. low requirements for expertise and personnel;
11. equitable incidence of benefits and costs;
12. congruence with the demand for land and supply of alternate sites;
13. ability to offer immediate control.

The choice of floodplain management policies depends on the multiple objectives of national and regional economic efficiency, equity, environmental quality, and other aspects of social well-being (Water Resources Council, 1973). Political feasibility and administrative effectiveness are also basic concerns affecting the design of a floodplain management program. Obviously, vested interests are likely to oppose any regulation of the floodplain, and any policy should be strong enough to overcome the objections of these groups.

The equity objective demands that management policies be fair to all concerned, although that does not imply treating everyone identically. A good policy will treat people in similar situations in a similar manner, while giving special consideration to the poor and others facing special hardships as a result of the policy. The objective of achieving

Many floodplains are sensitive environmental areas

Photo by M. Fahay

equity involves addressing the relations between the residents of the floodplain and those in the region outside the floodplain, as well as the relations *among* floodplain residents.

Environmental quality is another important objective, whether it is interpreted with regard to human values alone, or ecosystem functioning values as well. In the first sense, floodplains often are associated with scenic, wildlife, and recreational amenities important for enhancing the quality of life. In the second sense, floodplains serve vital ecosystem functions, such as aquifer recharge, or are important for the preservation of other sensitive areas such as estuaries, marshes, or dune systems.

Economic efficiency is concerned with the maximization of social welfare at a given level of resource expenditure. The concept goes beyond cost-effectiveness because the analyst must determine the appropriate level of resource utilization. Even if a policy is economically efficient, it is not necessarily desirable. Regional economic development, for instance, can be a valid goal, even at the expense of national economic efficiency.

ECONOMIC EFFICIENCY AND FLOODPLAIN MANAGEMENT

Economic efficiency is concerned with reaching the highest level of economic well-being. It is achieved through the proper level of resource utilization and the allocation of resources for maximum advantage. Economic theory assumes that individual self-interest is an important motivating force in human behavior, and that prices act as signals guiding economic decisions. Public policy can change relative prices and modify consumptive behavior by restricting the supply (direct regulation of floodplain land) or by decreasing demand (taxing floodplain occupancy or subsidizing outmigration.

Floodplain land may be a valuable resource and, in some cases, development may be economically desirable. Alluvial deposition may have built up rich soil for agriculture, or sand, gravel, phosphate, or gypsum for mining. A waterfront location is important for river or ocean transportation. Historically, urban centers have developed at strategic locations along water bodies, creating an impetus for further growth in the floodplain. Also, the location may be convenient as a source for inexpensive irrigation or industrial process cooling water. Effective floodplain management must determine *how much* land development is economically efficient and at *what* intensity of use.

Figure 1 provides a simplified rationale for economic efficiency in floodplain management. The object is to minimize the total social cost of floodplain management. Total social cost is the sum of the costs of relocation and floodproofing, less the cost of damages avoided by relocation of development, or the restriction of further development in the floodplain.

If society as a whole could make the decision, we would choose an amount of floodplain use represented by point *M* at a total social cost of *A*. In fact, floodplain land use activities are now subsidized because the government builds flood control projects and bails out victims of flooded areas. Because of this subsidy, the sum of damages that floodplain residents would avoid by staying out of the floodplain are less than the damages that society would avoid if the floodplain were preserved as open space. As a result, aggregating economically rational decisions results in more land development in the floodplain (at a level represented by point *N*) and higher total social costs (equal to point *B*). The economically efficient amount of development (*N*) could be achieved by 1) eliminating subsidies, 2) taxing floodplain occupancy, or 3) subsidizing relocation out of the floodplain.

FIGURE 1

THE ECONOMICS OF FLOODPLAIN USE

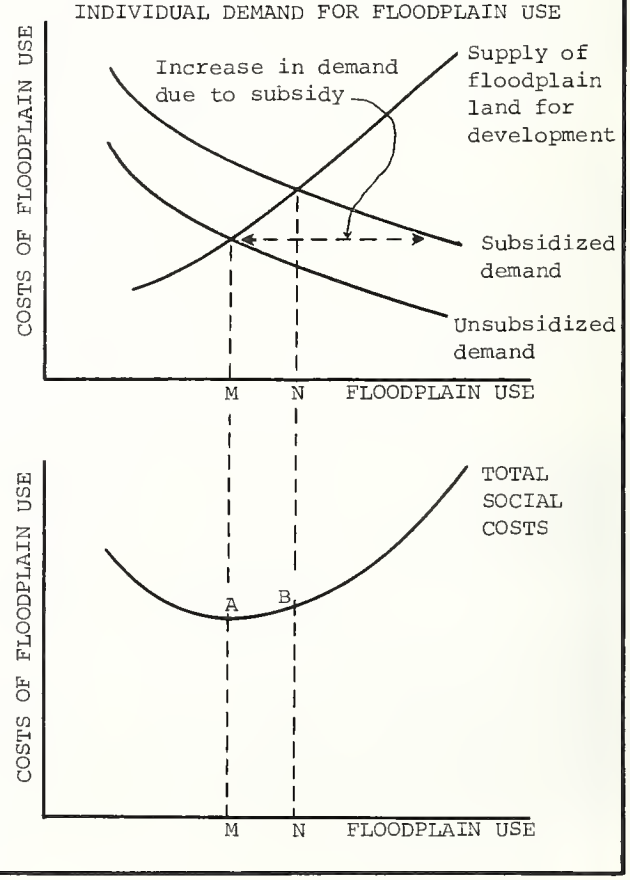

Figure 1 captures the main idea behind the economic approach, but a more detailed analysis of benefits and costs should be carried out. We need information to derive probabilities for the frequency and length of flooding by area, and also the amount, values, and expected losses of damageable property within the floodplain. Additionally, we must translate into

"EFFECTIVE FLOODPLAIN MANAGEMENT MUST DETERMINE HOW MUCH LAND DEVELOPMENT IS ECONOMICALLY EFFICIENT AND AT WHAT INTENSITY OF USE."

cost figures the expected loss of life and limb, and the social, environmental, housing, transportation, employment, health, and security disruptions. Actually, the same information is needed to set up a rational system of direct regulation like floodplain zoning. If no floodplain management policies are implemented, society is making implicit default estimates of these values.

In a rational world, with an ideally functioning market, "people would suffer [economic] damage only when every alternative course of a action was more expensive .... They would withdraw from floodplain locations when expected damages are greater than or equal to the value of land .... They would floodproof as long as the expense is less than or equal to the damage reduction" (James, 1968:7). Governmental intervention distorts locational decisions, but there are also problems with leaving everything to the market. Individuals may not perceive risks and benefits properly bacause of a lack of knowledge or ability to deal with complex multivariate probability distributions. People may also have an excessively short time horizon in mind, or they may deny the hazard altogether. Individuals may base their decisions about location or floodproofing on "anchoring behavior" (an excessive reliance on a small amount of concrete data or previous experience), or "gambler's fallacy" (what happened last year is unlikely to reoccur this year). The poor may be the least likely to be aware of the extent of the hazards.

THE PROBLEMS OF DIRECT REGULATION

In general, the direct regulatory technique of floodplain management is not economically efficient because it ignores differences in the marginal costs of relocation and floodproofing among firms and individuals in different locations and industries. It does not provide a mechanism for balancing the marginal costs with the marginal benefits to the company.

From an administrative point of view, the relative inflexibility of direct regulatory mechanisms can present several problems. Because of "grandfather" clauses and other exemptions included in most land use control ordinances and enabling legislation, direct regulation is often ineffective in dealing with existing problems. Zoning laws in eighteen states exempt agricultural uses, while enabling acts in twenty-nine states exempt pre-existing uses unless they constitute a nuisance (Kusler, 1976:5). Zoning systems are further prone to irrational variances, which are unfair to other floodplain landowners and society.

The inflexibility of direct regulation is also a problem in the achievement of social equity. It does not preserve the right of individuals to make their own decisions, nor does it make direct allowances for reducing the heavy burdens that it may impose on individuals --especially the poor. Indeed, direct prohibition of floodplain residence may increase the cost of housing by restricting supply, but more importantly, it may make housing unavailable to the poor.

A final problem with direct regulation is that vested interests are likely to oppose regulatory laws, particularly when development is forbidden. Coalitions of these interests may be able to apply enough pressure to result in a weakening of the regulatory effect. Even when laws are strong, there exist problems with inspection and monitoring for building codes, floodproofing requirements, and conformance to zoning requirements. There may be little power to impose meaningful sanctions for violations, and even when the power is available, individuals and firms may escape by delaying compliance until the regulatory agency is overburdened and unable to go through lengthy legal proceedings.

THE ECONOMIC APPROACH AND ECONOMIC EFFICIENCY

Economic disincentives can deter or upgrade the safety of floodplain activities. In parallel, economic incentives for moving out can decrease the intensity of land uses without prohibiting residents from continuing the same activity in the same location. They are simply penalized or encouraged for behavior depending on social costs caused by their activities. When infrastructure is already built up, it may be more economical to stay in the floodplain and pay the tax or forego the subsidy. Areas with some flood hazard may still be the most desirable locations for certain land uses. As long as all the benefits of floodplain use exceed the social costs, and the beneficiaries of floodplain development bear those costs rather than taxpayers in general, use of the floodplain should not be restricted. In short,

North Carolina's Growing Problem

Steven P. French

While the exact amount of flood-hazard area in North Carolina is unknown, a reputable 1973 study estimated this area to be 3,652,000 acres, or twelve percent of the total land area of the state (Goddard, 1973). A total of 174 communities have been identified as flood-prone by the National Flood Insurance Program. Based on the number of flood insurance policies in force in November 1978, North Carolina has at least 18,647 structures located in flood-hazard areas.

Traditionally, flooding has been less serious in North Carolina (and the Southeast, in general) than in several other parts of the country. North Carolina did not develop urban concentrations along major rivers or in coastal areas around seaports, and the concentration of development in the piedmont area of the state, where flooding is relatively less severe, has been a major factor in North Carolina's past record of small flood losses.

Recent changes in the pattern of development, however, are likely to lead to serious flood problems in the future. The records of the National Flood Insurance Program (NFIP) show that there is continuing encroachment by new development on hazardous areas. In 1977, the most recent year for which records are available, 1,927 construction permits were reported for flood hazard areas in North Carolina.

"...THE CONCENTRATION OF DEVELOPMENT IN THE PIEDMONT AREA...HAS BEEN A MAJOR FACTOR IN NORTH CAROLINA'S PAST RECORD OF SMALL FLOOD LOSSES."

Assuming an average value of only $30,000 per construction permit, this number of permits represents an investment in hazardous areas of $57 million in 1977 alone.

NFIP records also indicate that the seriousness of the flood hazard and the rate of encroachment vary among the regions of the state. For example, the number of *flood insurance policies* issued in the coastal area (5,034) is more than four times the number in the Piedmont region (1,183), even though the Piedmont contains the bulk of the state's population and urban development. The number of policies in the coastal area is nearly ten times greater than those issued in the mountain area (531), even though the most recent floods have been in the mountains. If the purchasers of flood insurance are acting rationally, the potential flood hazard is considerably more severe in the coastal area than in the rest of the state. Additionally, the number of *construction permits* issued in hazardous coastal areas in 1977 was ten times the number issued in either of the other two regions.

Given that there is a significant amount of urbanization in hazardous areas in North Carolina, what are the causes of this problem? The natural amenities offered by hazard areas seems to be one of the most important factors.

"ACCESSIBILITY TO URBAN SERVICES AND PROXIMITY TO NATURAL AMENITIES WERE TWO ADVANTAGES MOST OFTEN CITED IN A SURVEY OF FLOODPLAIN OCCUPANTS."

A 1971 study found that many floodplain residents were willing to bear the risk of flooding to enjoy the perceived advantages of locating there (James et al., 1971). Accessibility to urban services and proximity to natural amenities were two advantages most often cited in a survey of floodplain occupants. Given the location of encroachment in hazardous areas of North Carolina, proximity to natural amenities would seem to be the major factor.

Flood insurance poses another problem for controlling the urbanization of flood-hazard areas. The existence of such insurance may encourage banks to provide financing that would otherwise not be available. Furthermore, underpricing of insurance may encourage undesirable urbanization since occupants do not bear the full cost of their location decisions. Current methods used to determine flood insurance premiums have been questioned. Since the methods for computing flood probabilities were developed for riverine flooding, wave and wind forces may not be accounted for correctly in calculating premiums for coastal areas. A study of losses associated with Hurricane Eloise indicates that actual losses significantly exceeded the losses predicted by the Federal Insurance Administration (Shows, 1977). The nearly ten thousand flood insurance policies in emergency program communities in North Carolina may be stimulating the urbanization of hazardous areas by actually sub-

sidizing such development in some cases and by making financing available in others.

The final factor leading to urbanization of hazardous areas in North Carolina is the lack of a state program for floodplain management. The Floodway Regulation Law adopted in 1971 has never received funding from the state or federal level (Stewart et al., 1978). This lack of funding places the entire responsibility for managing and regulating flood hazards with local government, except in the coastal areas which are covered by the Coastal Area Management Act (CAMA). Even under CAMA, however, local government has the primary role in regulating hazard areas; this job is too difficult for local government to handle alone, especially considering the fiscal incentives local government has to increase the property tax base through new development.

In summary, there has been little or no effort by state or local government to discourage the trend toward large scale urbanization of flood hazard areas in North Carolina. Without some form of planned intervention, flood losses of life and property in North Carolina can be expected to continue climbing in the coming years.

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tax and subsidy policy maintains efficient land uses while discouraging socially unproductive uses that are also uneconomical to the entrepreneur.

We can use taxes and subsidies to change an individual's awareness and perception of flood hazard, and provide artificial price incentives for more economically efficient responses. Taxes should be structured to provide periodic reminders to floodplain occupants and should be collected frequently enough so that occupants can contemplate leaving or floodproofing; annual or semi-annual tax payments should suffice. It must be remembered that if the tax is too low, the program will not be effective. Nor should the tax be set so high that it tries to prevent all potential flood losses, especially rare, low-probability floods. The 100-year flood is a generally accepted standard. As for subsidies, decisions of individuals and firms to relocate outside the floodplain are affected more by a one-time payment, since moving is a one-time event, whereas the decision to remain is made continuously or at certain discrete time intervals. Taxes and subsidies may be adjusted until the right levels are achieved, but they should be stable enough so that decisions can be made more readily.

THE ECONOMIC APPROACH AND EQUITY

The economic approach allows long-term residents with sentimental ties to an area to remain, providing they pay the social costs and bear the risk for their own decision. Thus, residents retain more freedom of choice. Disincentives and incentives are more equitable than direct regulation because people are not forced to take specific actions.

Equity is also served because people who live outside the floodplain are not forced to pay as much to protect floodplain residents. This savings occurs even if subsidies are used to encourage relocation because less money will be paid out for structural projects, damage, relief, and rescue expenditures.

If the taxing option is chosen, the tax burden may go up in the floodplain itself, but the overall tax burden in the region will go down. Still more critical from an equity standpoint, third party taxation of non-floodplain residents for the benefit of floodplain residents will decrease. The burden will fall on those individuals and firms whose activities are more closely associated with the flood hazard. Furthermore, states are relatively free to impose new tax and subsidy programs on existing residents.

Economic tools can also be tailor-made to minimize impacts on those who can bear them the

least. A tax disincentives program will not cut the supply of housing as much as stringent land use regulation, although a tax program will increase the price. Cash or in-kind payments could be used to compensate the low income residents. Better still, in terms of the efficiency and effectiveness goals, subsidies can be given to these individuals to help them move out of the floodplain and into decent housing elsewhere. Tax rates could be set on a progressive basis or could be subject to minimum income thresholds, or taxes could be combined with subsidies up to a maximum income level.

Equity may also be of concern to regional development. Seldom is an entire region in a floodplain, and development that is periodically inundated does not go very far in promoting a stable economic base for a less developed area. It would be to the mutual advantage of both the residents and outsiders if development were located outside the floodplain and compensation paid into the area.

Economic disincentives and incentives go a step beyond the federal flood insurance program. Economic measures are set up to account for spillover costs such as the costs of public structures and rescue, relief, and rehabilitation rather than just the damages to life, limb, and property.

Cochrane (1975:111), in evaluating the current distributive effects of natural hazards, found that "the federal government under a wide variety of relief programs seems to bear a substantial proportion of the loss to property .... However, this percentage tends to decline as the severity of the event [increases]." At the same time, the current composition of federal programs favors middle and upper income groups since the poor may not qualify for government loans. Tax deductions are also worth more to those in higher tax brackets, and forgiven loans disproportionately benefit those with the most wealth at stake.

"ECONOMIC TOOLS CAN...BE TAILOR-MADE TO MINIMIZE IMPACTS ON THOSE WHO CAN BEAR THEM THE LEAST."

If a disproportionate percent of the poor live in areas subject to the most frequent and severe catastrophic flood events, they also bear a larger share of injuries and deaths, and it is likely that they will be in those locations due to lower land prices and rents.

Federal aid may be useful in cases where a flood-prone locality is in a financially depressed region that is unable to impose a

Structural techniques of flood control are meeting increasing public opposition.

greater tax burden on residents or fund subsidies. The Corps of Engineers is empowered to acquire land and relocate buildings and utilities off the floodplain; that may be cheaper than building a giant impoundment even if the locality by itself cannot afford the relocation costs.

FEASIBILITY OF THE ECONOMIC APPROACH

Taxation of floodplain use will encounter political hostility, but less than that generated by other tools such as floodplain zoning. Unless the taxing jurisdiction coincides with the flood-risk areas, other groups will also gain from imposition of the tax. General taxpayers will not have to bear the burden of taxes for rescue, relief, and rehabilitation if the tax is set at the proper level and funds set aside for these purposes. If inefficient development is pushed out of the floodplain, the total tax burden should go down. Unfortunately, people may fail to perceive this logic and this could have very real political repercussions.

A tax system is more flexible to administer because the rates can be adjusted up or down more easily and faster than other regulatory mechanisms. Since floodplain locations shift, taxes can be adjusted to fit changing natural conditions or account for the cumulative effects of small developments. Taxes are also more flexible as they are not bound by grandfather clauses.

Taxes or subsidies with rates set according to explicit legislative criteria are probably less prone to charges of political bias and favoritism in administration than is direct regulation. Tax payments are a matter of public record and fewer avenues for variances

exist with taxes than with zoning. It should be a simple matter to determine whether the tax on a parcel has been paid or not. Administrative costs would be low if the tax were tied into the existing property tax base.

Property taxes do have some intrinsic problems that result from disparities in services, differences in size of assessment jurisdictions, the manner in which competent assessment personnel are employed and trained, the types and numbers of properties to be valued, and the state-local governmental relations and responsibilities (Back, in Lynn, 1976:62).

Due to administrative costs and political realities, recapture of social costs or payment of relocation subsidies should be above a minimum threshold size. At what point should the tax be collected or subsidy paid out? There are many possibilities:

1. At the point when public action causes the event (difficult to determine in practice unless the event is a very specific one such as relocation out of the floodplain);
2. Upon sale or transfer of property (harsh if private losses are incurred before that time);
3. Upon gift by owner (can lead to loopholes);
4. Upon death of owner (a proxy for sale, but does not impair real estate transactions, although it also does nothing about the land use before that time unless combined with regulations. Corporations persist.);
5. Upon attempted bona fide sale at a lower price if caused by a wipeout or a higher price if due to a windfall (less harsh, but prone to abuse);
6. On beginning or completing development (this option makes a great deal of sense for a floodplain tax or subsidy system aimed at reducing development in critical areas);
7. On granting or refusing development permission (even better than option six);
8. Each year or at some stated arbitrary length of time (this scheme also makes sense for a floodplain tax or subsidy program. Taxes would be assessed several times a year as a reminder of flood hazard). (Hagman and Misczynski, 1978:35-40)

In designing the taxation system, the sources of political opposition and support should be identified and the information used to advantage by the planner. Floodplain residents or landowners are the most obvious sources of opposition. Farmers, land holders, and speculators favor a positive (subsidy) program with fewest sanctions for conversion of undeveloped land. Conservationists favor a positive program with stiff sanctions for conversion, or a negative (tax) program with differentially high taxes for new and existing development. In general, subsidy programs are politically popular and may be difficult to uproot once enacted; subsidies and preferential tax assessments are also relatively invisible and not usually subject to annual budget scrutiny, which can be a problem.

James believes that property taxes will not be used as a major environmental protection device because:

1. the environment has traditionally been a common-property resource;
2. divergence of private versus social costs creates entrenched political interests;
3. subsidies and grants are more popular;
4. "the tax structure already suffers from too much social engineering";
5. activities of various levels of government would not be affected. (Lynn, 1976:183)

On the same subject, Haar states that "among the lessons taught by the American system [of land use control], perhaps the most valuable one is that incentives often produce better results than legislative edicts" (Baker and McPhee, 1975:57).

TYPES OF LAND USE TAXES

A wide variety of economic disincentives can be used to guide land use: charges, fees, assessments, and other instruments lumped together under the term taxes (although their legal status varies with the precise type of system). Disincentives may be defined as "a monetary charge levied by government on conduct which is not illegal but which does impose social costs, for the principal purpose of discouraging the conduct" (EPA, 1974:6). Taxes may be used to guide future development away from the floodplain or discourage inefficient uses from staying in. According to Delogu (1968:673), the system can be set up in more complex ways to fine-tune the effects if there is a "hierarchy of undesirable land use situations and countervailing public actions could be construed by the legislature and appropriate tax rates imposed." Taxes also provide a source of revenues which can be used to counteract adverse impacts of the taxed activities.

Land use taxes can be structured in various ways. Some examples are:

1. flat rate per acre;
2. variable rate with type of use;
3. variable rate with type of use and quality of structure;
4. rate dependent on actuarial risk to make people aware of true costs;

5. rates set to cover the extra costs of public services and contingency costs;
6. rate based on population density of residential use as a proxy for quantification of generated externalities;
7. rates adjusted until the amount of desired change in land use patterns is achieved.

Some other types of specific disincentives include special assessments, exactions on development permission, impact taxes, sale of development permission, and transfer taxes.

Special assessments penalize incompatible uses in a natural hazard area. Although special assessments are just the reverse of the well-accepted preferential assessment tool, penalty assessments are much more controversial. Special assessments to finance particular flood control projects or to set aside a fund for flood relief are generally viewed as legal and equitable. Special assessments can be compared to cost-sharing by the beneficiaries of flood control works or relief programs. When special assessments are used, closer scrutiny over the exact benefits and costs of a proposal can be expected. It is easier to base assessments on cost allocations because benefits are uncertain as they are dependent on when a flood occurs.

Exactions on development permission are charges imposed with subdivision requests, rezonings, conditional use permits, variances, or building permits. The legality of exactions varies with state and local law, but the trend is toward acceptance of exactions when the amount paid is less than the gains from development (Hagman and Misczynski, 1978: xxvii).

Impact taxes are applied later in the development sequence than exactions and are meant to pay for needed public facilities and services. In some cases, the cost of servicing floodplains will be greater than flood-free areas; for example, stronger water pipes must be used. According to Hagman and Misczynski (1978:xxvii), "Impact taxes do not enjoy the same legal acceptance as exactions .... [but] may be more appropriate as general windfall recapture devices than exactions are."

"RELOCATING EXISTING LAND USE IS ESPECIALLY DESIRABLE WHEN THE RISK OF FLOODS OR COST OF CONTROL WORKS IS VERY HIGH."

Sale of development permission is related to contract zoning. Regulatory permits are issued in exchange for certain monetary or other considerations. In the extreme, this may be construed as sale of a license to violate a land use regulation, which is illegal. Although the theoretical price would equal the net social loss from granting development permission, this method may have some loopholes. Hagman and Misczynski (1968:xxxviii) point out that speculators might buy up development permissions and officials might end up "playing a real game of monopoly rather than...administering a public trust," and further that "no court has ever approved a sale of the right to regulate. Therefore a permission would be subject to subsequent regulation even by the contracting government."

Transfer taxes are sales taxes paid upon sale or gift of land. They may be ad valorem taxes based on a percent of the value with fixed or sliding rates or may be levied on increases in land value. If high enough, these taxes will affect a buyer's decision to locate in the floodplain. However, transfer taxes also have the dual effect of discouraging current residents from moving out. Unscrupulous businessmen may even evade the law by setting up dummy corporations and claim that no sale or gift has taken place.

TYPES OF SUBSIDIES

The purpose of land use subsidies for the floodplain are to preserve compatible uses and encourage elimination of incompatible uses. Subsidies may be outright grants, low interest loans, special tax benefits, or other compensatory schemes such as transfer of development rights.

Relocating existing land use is especially desirable when the risk of floods or cost of control works is very high. Although relocation subsidies have been seriously proposed for Prairie du Chien, Wisconsin, they have not been extensively used (Kusler, 1976:118). If a subsidy program is voluntary, people will only accept the subsidies when they perceive it to be their interest to do so. Alternatively, relief programs could be designed to reward people who move out of an area after a flood hits.

Governments should also investigate the use of direct payments, loans, or tax credits for floodproofing. Tax credits are more equitable than deductions, which are less valuable to lower income groups.

Easement purchase or differential tax assessments can be used by governments to reduce development pressure on floodplain land in agricultural or open space areas. Easements and differential assessments are well accepted tools in almost all states. Differential assessment increases the profitability of farm use and reduces carrying costs on open space. For this reason, differential assessment must

be combined with land use regulation or economic disincentives on development to prevent sprawl caused by market postponement of conversion aided by tax shelters.

There are three types of differential assessment programs. The first, *preferential assessment*, bases the value for tax purposes on current use and not the "best and highest possible use." Because there is no penalty for later conversion to other uses, this tool can only modify the *rate* of development of the floodplain.

Deferred taxation is similar to preferential assessment, but back taxes must be paid if the agricultural or open space is developed. Clearly, unless the penalty is severe, back taxes are such a small part of development costs that delays in conversion are only temporary.

Restrictive agreements are voluntary contracts between land owners and governments to keep land in a particular use for stated periods of time in return for lower tax assessments. Generally, the tax differential plus interest and a penalty must be paid if the agreement is broken. Sometimes, long advance notice is also required before development is allowed. Restrictive agreements are more complex to administer than deferred taxation because contracts are individually negotiated. They can, however, be applied more selectively.

Another incentive/disincentive technique for development control is that of zoning by special assessment financed by eminent domain. Landowners in restrictive zones are compensated by receipts from special assessments on landowners outside the floodplain whose property increases in value due to supply restriction. This is an old technique which has been upheld in the courts, but is now infrequently used.

THE LEGALITY OF NON-UNIFORM TAXATION

The Fourteenth Amendment of the U.S. Constitution requires equal protection and due process of law for all citizens of a state. Equal protection does not imply equal treatment of all individuals. It does mean that governments must weigh public and private interests and make decisions on a reasonable basis. Non-uniform taxes based on location inside versus outside the floodplain do not violate the Fourteenth Amendment. If the entire local jurisdiction is inside the floodplain, the locality is not confronted with accusations of discriminatory taxing unless it sets multiple rates for different segments of the floodplain according to specific hazard potential. Unfortunately, a locality entirely within the floodplain would be risking a competitive disadvantage compared to its neighbors in and out

In severe floods, structures can end up as debris and add to erosive scouring.

of the floodplain. Thus, the locality is not likely to undertake a taxation policy on its own, unless it has already reached its desired total level of growth or cooperates with all localities within a region on a floodplain management program.

There are precedents, however, for using taxes to discourage undesirable behavior. State and federal taxes are already being used to provide economic disincentives against behavior which is harmful to individuals and the environment. Sumptuary taxes on drugs, firearms, gambling, and alcohol, for example, are widespread, and are not considered violations of equal protection requirements.

Most state constitutions prohibit use of public funds for direct private gifts. A subsidy tied to a desired action is *not* a gift. However, if just the poor received relocation subsidies and the rest of the inhabitants have to pay floodplain occupancy taxes, there may be accusations of unequal treatment. If "similarly situated" is interpreted the same way it is for the progressive income tax, there would be no problem.

The exact wording of state constitutions and the implied connotations have a good deal of bearing on court acceptance of tax classifications. Most states have some kind of constitutional clause relating to uniformity of the property tax structure. These clauses can be divided into ten groups:

1. "Property shall be taxed according to its value." (Arkansas, Maine, and Tennessee)
2. "Property shall be taxed in proportion to its value." (Alabama, California, Illinois, and Nebraska)
3. "The legislature may impose proportional and reasonable assessments, rates, and taxes upon all persons and estates." (Massachusetts, New Hampshire)

4. "There shall be a uniform rule of taxation." (Michigan, New Jersey, Ohio, and Wisconsin)
5. "Taxation shall be equal and uniform." (Mississippi, Texas, West Virginia, and Wyoming)
6. "The legislature shall provide by law for a uniform and equal rate of assessment and taxation." (Florida, Indiana, Kansas, Nevada, South Carolina, and Vermont)
7. "Taxes shall be uniform upon the same class of subjects." (Colorado, Delaware, Georgia, Idaho, Louisiana, Minnesota, Missouri, Montana, New Mexico, Oklahoma, Oregon, Pennsylvania, and Virginia)
8. "Taxes shall be uniform upon the same class of property." (Arizona Maryland, North Carolina, North Dakota, South Dakota, and Washington)
9. "There shall be a fair distribution of the expense of government." (Rhode Island and Vermont)
10. No uniformity clause directly pertaining to taxation. (Connecticut, Iowa, and New York) (Newhouse, 1959:9-16)

In general, there is more flexibility in tax classifications than first meets the eye. Uniform rules imply classifications are acceptable. Often, careful creation of tax districts can circumvent possible problems. The most restrictive situation occurs in categories five and six, which outlaw taxation that is not equal and uniform.

In North Carolina, the General Assembly may classify real property for different tax rates. Presumably, it could place floodplain land in a separate category. However, this power cannot be delegated to cities and counties to set up their own classifications themselves (Brower et al., 1974:80).

Another possibility is designation of urban and rural service districts. A tax break could be given on land in the floodplain if the governmental unit refuses to extend services there. This tax subsidy may backfire and encourage development if the service boundary is not taken seriously by developers and the government; it is best used in conjunction with regulations.

A MIXED STRATEGY

Now that the case has been made for an economic approach, it can also be mentioned that economic incentives, direct regulation, and structural control are not mutually exclusive tools. They can be integrated to provide effective floodplain management. Additionally, a mixed strategy is safer if there are doubts about the legality of a particular element of the overall plan.

A minimum level of effectiveness can be ensured by overlaying the various approaches. If taxes and subsidies are set too low, zoning and building codes can guarantee some desired level of land use control. Further, zoning, by itself, may be useless for modifying existing uses rapidly, while taxes and subsidies alone may not be able to change locational preferences quickly. Land use locational decisions are a long time in the making and involve habitual behavior; we do not know the relative elasticities of responses to taxes and subsidies.

An integrated approach might also be useful in a rapid growth situation. Since they can be set into action quickly, taxes are well suited for use in an interim control program until a comprehensive plan or regulatory guidance system can be prepared or expanded.

"...ECONOMIC INCENTIVES, DIRECT REGULATION, AND STRUCTURAL CONTROL ARE NOT MUTUALLY EXCLUSIVE TOOLS."

With moderately high taxes and subsidies, in combination with land use controls, the efficiency and equity advantages of the economic approach can be substantially preserved. A mixed strategy is, therefore, not as inconsistent as it may seem at first, and is probably the best strategy for practical experiments with innovative policies.

CONCLUSION

Flood losses are increasing, despite expensive structural flood control works because of exogenous development pressures undampened by effective land use guidance. Direct regulation of land use has been largely ineffective and is hindered by special treatment of existing uses and by proliferation of variances. It is time to experiment with a different approach depending most heavily on economic incentives and disincentives, in addition to regulation and structural control if necessary.

It does not make economic sense to prohibit all use of the floodplain. Taxes and subsidies can be set up, at least in theory, to encourage the socially desirable level and types of activities appropriate for the floodplain. It is economically efficient to bear some risk and provide a certain degree of floodproofing, including structural controls. Aside from being more efficient, the economic approach is also more equitable. Disincentives and incentives do not force anyone to avoid or leave the floodplain. Instead, floodplain residents must

pay the full costs of their locational decision. including spillover costs and environmental damage. Often, people are unaware of the true dangers facing them and society can bring the risks to their attention with the periodic reminder of a tax bill.

Still, political opposition to any strong floodplain land use guidance system can be expected because of the power of special interest groups, even though society as a whole would be better off. Legality depends on specific requirements of states and localities and the program design. Regulatory taxes based on reasonable criteria are likely to be upheld.

There are many varieties of taxes and subsidies which can be investigated. Each form has its own particular intended and unintended consequences. The best floodplain program may be a combination of taxes, subsidies, regulations, and structural control.

"PLANNERS HAVE LITTLE TO LOSE IN ADVOCATING THAT THE FLOODPLAIN TAXES AND SUBSIDIES REACH THE PUBLIC AGENDA AS A SERIOUS ALTERNATIVE."

It is true that because the use of taxes and subsidies is innovative, we have little real world data on their effectiveness in controlling land use. The lack of experience is an advantage as well as a problem. These tools are riskier to attempt, but give the planner more room to experiment. At any rate, previous flood control policies can be safely judged a failure. Planners have little to lose in advocating that the floodplain taxes and subsidies reach the public agenda as a serious alternative.

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Mark D. Hunsberger

Growth Management through DRI Review: Learning from the Florida Experience

The "Quiet Revolution" is a name popularly applied to the bundle of innovative land use controls developed since the early 1960s. Two ideas with major implications for the state role in land use policy are embodied in the innovations: concern for the health of environmental systems and assertion of state and regional interests in local land use decisions. Several techniques have been developed to implement these two concepts, including state-wide land use planning, state permitting in sensitive environmental areas, and state review of local plans.

Much of the early impetus for strengthening the state land planning role came from the American Law Institute's *Model Land Development Code*, which was developed during the 1960s and early 1970s. One of the Code's most prominent provisions, review of Developments of Regional Impact (DRIs), has been ignored by all but a few states. In fact, only Florida has faithfully transcribed the DRI process from the Code to legislation.

The slow spread of DRI review may well be due to its novelty; state governments are unwilling to institute a controversial program before its effectiveness has been demonstrated. In the case of Florida, however, a six-year record of DRI cases now exists, providing a sufficient basis for a preliminary evaluation. Using the Florida program as an example, this article discusses the role of DRI review in state growth management, and identifies specific program components that the Florida experience has shown to be crucial to program effectiveness.

RATIONALE FOR DRI REVIEW

The need for DRI review is based on the premise that certain land uses generate spillover effects reaching beyond the local jurisdiction. Traditional local control over land use tends to ignore such effects, being concerned only with estimation of net benefits to the local jurisdiction.

Recognizing that local control can lead to unwelcome regional externalities, but that the majority of land decisions affect only the local jurisdiction, the ALI Code emphasizes selective state intervention in local decisions. The first half of this strategy involves state review of local land development regulations in Areas of Critical State Concern: geographic areas containing resources, public facilities, or new communities of state interest.

The second half of the strategy, DRI review, is aimed at specific types of development rather than particular land areas. DRI categories are to be defined on the basis of projected impacts on the natural environment, traffic, population, and secondary development. In addition, the categories are to account for the size of the site and for unique qualities of particular areas. The Code also provides that certain public projects not included in the DRI categories, such as public housing, can be declared Developments of Regional Benefit for review as DRIs.

The local Land Development Agency must follow certain procedures in evaluating a permit application for a project qualifying as a DRI. The agency must first weigh the probable net benefits and net detriments generated by the project in the local jurisdiction, as well as in surrounding areas. If the project conforms to local ordinances, the application can be denied only if net detriments exceed net benefits. If the project is not authorized by ordinance, benefits must exceed detriments, the proposal must not interfere with the local or state land development plan, and the departure from the ordinance must be reasonable in light of projected benefits. The State Land Planning Agency is permitted to intervene in the balancing proceedings by submitting its own assessment of the issue, acting either on its own initiative or in response to a local request.

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The ALI Code also allows for appeal of the action taken by a development agency on an application. An appeal may be initiated by the local government, the applicant, the parties to a previous administrative hearing, or neighborhood residents if no hearing has been held. Appeals are heard by an independent, elected State Land Adjudicatory Board.

THE FLORIDA PROGRAM

The Florida DRI program established by the Environmental Land and Water Management Act of 1972 (the Act) follows the ALI Code, with a few significant exceptions. The goal of the program, as stated in the Act's preamble (Florida State Code ch. 380), is to "facilitate orderly and well-planned development." No mention is made in the Act of limiting growth, DRI review being intended to manage the *quality* of development and not the amount and rate of growth.

The Act directs the state land planning agency to create guidelines and standards for determining whether particular developments exert regional impacts. The criteria specified in the Act pertaining to design of guidelines are identical to those in the Code for category definition, with the addition of impacts on energy consumption. The Division of State Planning subsequently defined twelve DRI categories and associated thresholds, which are summarized in Figure 1.

The administrative structure and procedures of the Florida program are outlined in Figure 2 and are essentially the same as those proposed in the Code. There are, however, four major differences from the Code. First, the affected Regional Planning Council prepares an assessment of regional impacts and recommends a final action to the local agency. Second, the local agency is not required to conduct a balancing of net benefits and detriments, but must merely consider the application's consistency with the state land plan, local development regulations, and the report and recommendation of the regional council. Third, appeals of development orders may be initiated only by the Division of State Planning, the applicant, the land owner, or the Regional Planning Council, although other interested parties may join in the action. Finally, the

FIGURE 1

THRESHOLD STANDARDS FOR DEVELOPMENTS PRESUMED TO BE OF REGIONAL IMPACT

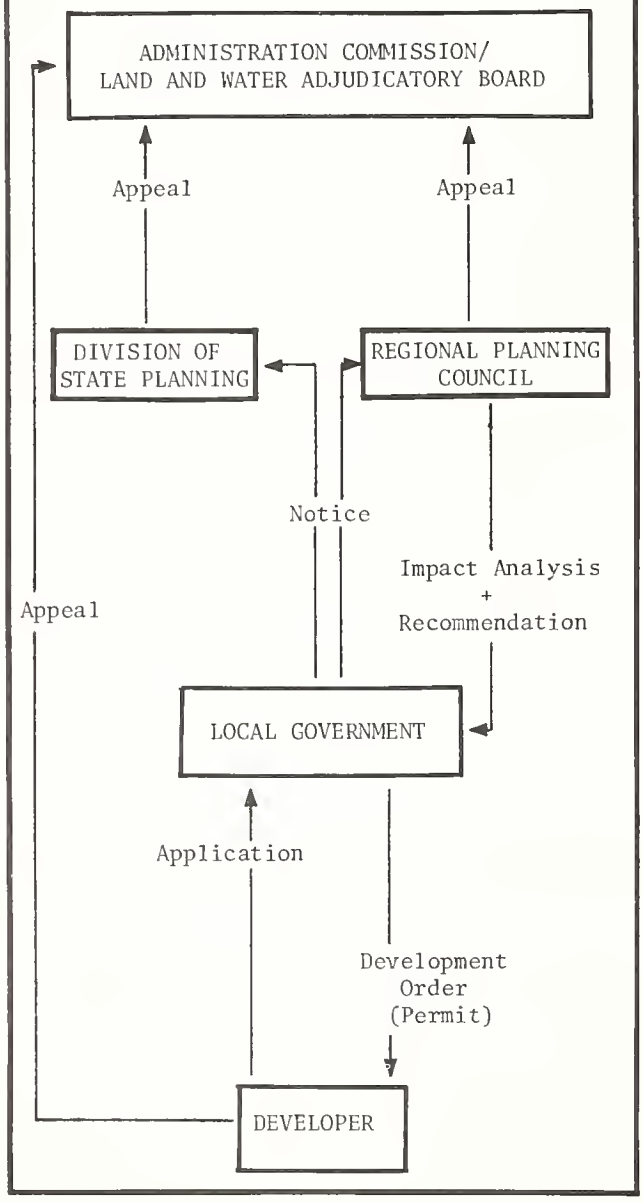
CATEGORY	THRESHOLDS
Airports	construction or extension of one runway
Attractions/Recreation Facilities	
Single Performance	2500 parking spaces or 10,000 seats
Serial Performance	1000 parking spaces or 4,000 seats
Pari-Mutual	any construction or any expansion of 10%
Transmission Lines	230 kv
Hospitals	600 beds
Industrial Parks	1500 parking spaces or 1 square mile of area
Mining Operations	1000 acres/year or 3 MGD of water use
Office Parks	30 acres or 300,000 ft^2 of floor space
Oil Storage	
<1000' from Navigable Water	50,000 barrel capacity
All Others	200,000 barrel capacity
Ports	100 slips for pleasure craft, all freight terminals
Residential	250-3000 units; sliding scale for counties of <25,000 to 300,000+ residents
Schools	3000 post-secondary students
Shopping Centers	40 acres, 400,000 ft^2 of floor space, or 2500 parking spaces

Source: Rules of the Florida Department of Administration, Chapeter 22F-2.

appellate body, the Land and Water Adjudicatory Board, is not independently elected, but is instead composed of members of the Florida Cabinet. The Cabinet consists of the Governor, Attorney General, Secretary of State, Treasurer, Comptroller, Commissioner of Agriculture, and Commissioner of Education; each is elected at large and serves primarily as an administrator of a state department. In addition to its appellate role as the Adjudicatory Board, the Cabinet also constitutes the Administration Commission, which must approve proposed changes in the categories and thresholds prior to their submission for legislative review.

FIGURE 2

ADMINISTRATIVE STRUCTURE OF THE FLORIDA DRI REVIEW PROGRAM



In its first five years, the Florida program resulted in local action on 192 DRI applications, including 25 approvals (13%), 152 conditional approvals (79%), and 15 denials (8%). The number of local actions taken declined steadily from 110 in 1973-74 to 8 in 1977-78. Residential developments accounted for the majority of all applications filed (58%), followed by shopping centers (13%). Thirty-nine development orders have been appealed. Regional councils have been party to appeals twenty-three times, the State eleven times, developers eight times, and counties twice. Most of these appeals were settled without going before the Hearing Board (Backenstoss, 1978).

IMPORTANT PROGRAM CHARACTERISTICS

Florida's experience with DRI review indicates that seven specific program characteristics deserve special consideration from those contemplating establishment of a similar program. These seven major areas are:

1. development categories and thresholds;
2. program flexibility;
3. administrative structure;
4. balancing of varied interests;
5. interjection of citizen concerns;
6. protection of private rights; and
7. enforcement.

DEVELOPMENT CATEGORIES AND THRESHOLDS

The ALI Code restricts review to those developments falling into the categories defined by the State Land Planning Agency. Hence it is essential that the categories devised cover the spectrum of development types. Political pressure will be brought to bear on the agency to exempt certain public and private projects from the program. In Florida, the political clout of affected interests resulted in legislative exemption of agriculture and forestry operations, as well as construction by highway authorities, railroads, and utilities in existing rights-of-way.

Several additional development types are effectively exempted from review by their omission from the categories developed by the Florida Division of State Planning. The most significant of these omissions are hotel/motel operations and major public facilities, such as highways and sewer extensions. The omission of facilities is especially significant for two reasons: first, these projects often act as strong regional growth stimulants; second, review of public facilities would permit assessment of projected service areas. At present, substantial cumulative regional impacts are generated by neighboring developments that individually do not qualify as DRIs. Should facilities be added as a category, however, all

parcels in the service area need not be owned by one developer or need not be developed simultaneously to come under DRI review.

Threshold determination is perhaps the most difficult problem faced in implementing a DRI program. Whether a state chooses the Florida procedure of category definition or instead adopts a generalized performance standard approach, some type of triggering threshold will be required.

The criticism most frequently made of the Florida thresholds is that they are set too high. This situation can be traced in part to the Act's definition of a DRI as a development affecting the citizens of more than one county. Because many of the state's counties are extremely large, the thresholds must be set high to satisfy the statutory language. Since the thresholds are merely presumptive and the final determination of DRI status rests on identification of extra-county impacts, high thresholds are not intrinsically wrong, but are useless as guidelines. Nevertheless, the absurdity of thresholds such as 3000 residential units in Dade County, and the fact that only one project falling below a threshold has ever been declared a DRI, indicate that the statutory definition of a DRI should be modified and some thresholds lowered.

With any point threshold, some developers will attempt to avoid review by designing projects falling barely below the thresholds. In the case of mining operations, Florida planners have addressed this problem by defining all single-company operations within a one-mile radius as a single development. An attempt to revise the residential thresholds in a similar manner was not successful. The courts however, have been somewhat receptive to the State's notion that single-ownership residential developments in proximity to each other can be reasonably defined as a single project (General Development Corporation v. Division of State Planning, 1977). This judicial interpretation does not address the cumulative effects of independent developments on neighboring sites.

"...ONLY FLORIDA HAS FAITHFULLY TRANSCRIBED THE DRI PROCESS FROM THE CODE TO LEGISLATION."

The Florida thresholds are primarily aspatial, divorced from site characteristics that determine the consequences of the physical impacts generated. Only in the case of oil storage facilities and residential developments are site factors taken into account. The oil storage thresholds are related to proximity to navigable water while residential thresholds increase with county population. Site characteristics are brought into consideration when the state prepares its binding letter of interpretation, a formal notice as to whether a project exerts multi-county impacts and therefore qualifies as a DRI.

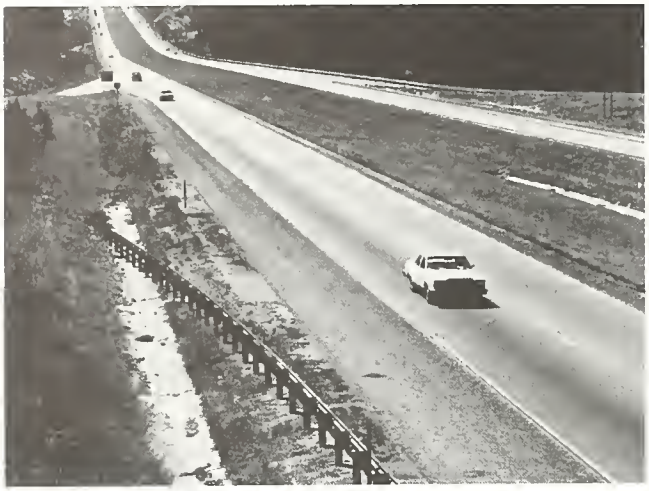
An alternative approach would be to tie thresholds more closely to site considerations. For example, residential development thresholds could be based directly on the amount of unused sewer capacity, proximity to surface water, or ecosystem type. This approach would be especially appropriate were the thresholds intended to be binding in and of themselves. In Florida, where "regional" is statutorily defined as meaning "multi-county" and the thresholds represent project scales at which regional impacts are only presumed to be involved, each case must be examined individually and site factors cannot readily be encased in rigid thresholds. The separation of site factors from the thresholds gives a state the flexibility to consider a great variety of impacts and site factors in its search for multi-county impacts, if indeed a DRI program is structured to require multi-county impacts as a project cnaracteristic for DRI review.

"THRESHOLD DETERMINATION IS PERHAPS THE MOST DIFFICULT PROBLEM FACED IN IMPLEMENTING A DRI PROGRAM."

PROGRAM FLEXIBILITY

In any state-wide regulatory program with major economic and environmental consequences, it is important that the administering agency adjust its procedures to meet changing market conditions and to address unforeseen problems. Under a DRI program, the procedures most likely to require revision over time are the development categories and thresholds. In the Florida program, revision of these administrative rules requires approval by the Administration Commission and the legislature, assent which has been very difficult to achieve (Backenstoss, 1978).

The problem of rallying political support for each proposed revision could be avoided by statutorily delegating authority over such matters to either the state land planning agency or its overseeing committee. Such delegation must be accompanied by specific statutory guidelines for design of the categories and thresholds if the program is to survive a constitutional challenge of improper delegation of power. Florida's critical areas program was recently invalidated on similar grounds (Cross Keys Waterways v. Askew, 1978).



In Florida, major highway construction is exempt from DRI review.

ADMINISTRATIVE STRUCTURE

In the interest of efficiency and austerity, a DRI program should avoid creation of an elaborate bureaucracy. The ALI version relies solely on local governments, the State Land Planning Agency, and the State Land Adjudicatory Board. Except for the Board, every state has an existing bureaucracy that could administer the program with only a modest expansion in technical personnel. Reliance on local governments for final decision making enhances local acceptance and meshes neatly with local review procedures for minor developments.

The Code advocates creation of an independent, elected Land Adjudicatory Board. The Florida Adjudicatory Board is such a body, being composed of the Governor and the Cabinet. However, because the principal interests and expertise of the Board members lie elsewhere, the arrangement has proven unsatisfactory. Due to the Board members' busy schedules, appeals are brought before a hearing officer and a recommendation is forwarded to the Board. Final decisions are typically arrived at ad hoc, without the benefit of systematic land use evaluation criteria (Pelham, 1977). This situation is decidedly inferior to a Board comprised of land use experts with the time to weigh appeals carefully and systematically. However, establishment of an elective process, unless accompanied by membership restrictions, will not guarantee the Board's expertise and objectivity.

The Florida program also relies heavily on the Regional Planning Councils as sources of recommendations and as initiators of appeals. The Councils exhibit considerable staff expertise in their project assessments, but their policy decisions are often the product of political bargaining among the local officials who serve as Council members. The decision to appeal is especially vulnerable to political considerations as it is much easier for a local official to vote to challenge the development order of a small jurisdiction than that of a populous, influential locality. If it seems necessary to delegate appeal and recommendation authority to bodies such as Regional Councils, it may be advisable to require a written statement justifying the action taken as a means of enforcing accountability to citizens and staff.

BALANCING OF INTERESTS

In theory, the DRI process forces two types of accommodation: balancing the interests of the several levels of government and balancing the various substantive concerns generated by development proposals.

The balancing of state, regional, and local interests is achieved by requiring that elements of each be considered in local application review. A natural tendency exists, however, for the local government to weight its interests most heavily. This tendency is addressed in Florida by requiring a written justification of the application's final disposition. Such a record illuminates the weights placed on various factors, and is available to all the actors in making their decisions to appeal.

The written justification also reveals weights placed on substantive concerns such as social, economic, and environmental issues. Nothing in the Code or the Florida program, however, is designed to ensure that different substantive concerns will be balanced. In Florida, the Regional Councils can use a state-produced guidebook in analyzing project data.

"THE SLOW SPREAD OF DRI REVIEW MAY WELL BE DUE TO ITS NOVELTY..."

The combination and interpretation of the data are, however, left to the discretion of the region. This approach may permit undervaluing of certain factors, but it allows greater consideration of those factors most important to the region, which could include, for example, housing costs. The Regional Council's recommendation is also required by law to address impacts on five areas: the natural environment, regional economy, public facilities, transportation, and housing. In addition, the state may prepare its own assessment, thus making it unlikely that the process will permit neglect of broad areas of concern.

It has been argued (Pelham, 1977) that, unlike the Code's net balancing technique, Florida's impact assessment approach is anti-developmental in that one detriment can block

a project that on the whole conveys net benefits. This contention is theoretically valid but irrelevant from a practical standpoint. Because of the political bargaining performed at the regional and local levels, the statutory requirements for regional reports and local public hearings, and the opportunity for negotiation afforded by the appeals process, Florida's impact approach appears to lead to bargaining among actors rather than to narrowly-focused rejections of applications. The very low rate of denials in the Florida program would seem to corroborate this assessment of the process.

One final means of forcing a balance among competing interests, the ALI Code's Development of Regional Benefit (DRB), has not been adopted in Florida. Intended as a device to circumvent local exclusionary practices, this measure would force localities to accept projects providing net regional benefit and complying with relevant development plans. Compounding the program's lack of a DRB provision is the State's contention that DRI zoning questions are separate from the review process and are therefore not subject to administrative appeal. Local exclusion based in zoning can only be appealed in the courts where the local ordinance has the weight of assumed validity.

The exclusion issue involves conflicts between levels of government, as in prison siting, and conflicts within communities, as in disputes over public housing. The Florida program protects the position of the local government in both situations. In 1975, the Division of State Planning proposed a new DRI category for government-assisted housing, but the amendment failed to win approval of the Administration Commission needed for legislative action (Backenstoss, 1978). The implication of this experience is that it may be prudent to seek a generalized DRB provision at program inception rather than to list controversial categories individually, which can create a convenient focus for opposition.

CITIZEN CONCERNS

It is generally accepted in planning circles that the participation of citizens in the planning process is highly desirable, yet the DRI program as envisioned and practiced is principally a staff exercise. Beyond the public notice and hearing requirements and the Code's general provisions for citizen participation at the local level, no mechanisms for public involvement are proposed. The limitation on public participation is, as always, based on the need to expedite the review process. It would not be inconsistent with program efficiency, however, to provide access points in the process where citizens could become involved in decision-making rather than to mandate more forums for public reaction to decisions already made. Local and regional

In evaluating a DRI permit, the local development agency must weigh the expected regional benefits, such as power generation, against unwanted local costs. *Photo courtesy of Duke Power Co.*

authorities could be motivated to expand their participation efforts if the state required that citizen advisory committee recommendations be included in both the regional recommendations and the local dispensation reports. This requirement could be incorporated either in the enabling legislation or in administrative rule.

In order to reduce expensive and time-consuming litigation, affected individuals should have the right to appeal a development order either independently or through a political or municipal organization. Standing to appeal is relatively universal under the ALI provisions, but in Florida the individual is dependent on the state or region to initiate an appeal. Especially when local governments may initiate appeals only through regional organizations and where public participation is meager, standing must be defined liberally if the rights of individuals are to be protected.

"...AFFECTED INDIVIDUALS SHOULD HAVE THE RIGHT TO APPEAL A DEVELOPMENT ORDER EITHER INDEPENDENTLY OR THROUGH A POLITICAL OR MUNICIPAL ORGANIZATION."

PRIVATE RIGHTS

As individual rights are highly cherished in this society, it is essential that a DRI program not run roughshod over the rights of property owners. Because DRIs are by definition large, rather unusual developments, a very small segment of property owners will be directly affected by the program. Additionally, as denial of a DRI permit is not equivalent to a ban on property use, allegations of uncompensated takings are likely to be rare. Where the quality of development is emphasized, as in the Florida program, denials will likely be relatively few and taking litigation even more improbable.

It has been effectively argued, however, that the costs imposed by DRI review infringe on the rights of developers (Healy, 1976). For a small developer, the representative cost of the required data, $3,000-$10,000, could indeed be substantial, especially in the event of a denial. The low rate of denials in Florida reduces the impact of this contention, although it does not refute it.

The time delay involved in the review process can also be considerable. The Florida Division of State Planning estimates that a typical case lasts five and one-half months from application to final disposition. The state planners are currently considering means of speeding up the process by streamlining administrative procedures.

Large employers inducing secondary growth qualify as DRIs.

ENFORCEMENT

For a DRI program to be effective, developers and local governments must adhere to the conditions attached to the development permit. Reliance on local implementation is a bonus in terms of administrative simplicity, but can be detrimental where the local government is understaffed or not enthusiastic. In these cases, it will be necessary for the state to monitor compliance. In large, rapidly growing states, such as Florida and North Carolina, it may not be possible to fund a state-wide systematic monitoring program. Such states may instead choose to maintain a small monitoring staff to spot-check areas with notoriously lax enforcement and those local governments which have suffered a reversal on appeal. In most areas, however, effective monitoring can be accomplished by relying on local governments and on information obtained through informal contacts with the regional council staffs and local citizen groups.

CONCLUSION

The Florida experiment with DRI review has been a qualified success. The program has reviewed 200 projects, in most cases imposing conditions on the development proposal. This has resulted in improved development quality, but has had little effect on the rate and amount of growth in the state.

The program has significant gaps in its coverage due to legislative exemptions, the omission of public facilities from the DRI categories, and the lack of anti-exclusionary tools. Finally, the thresholds appear to be too high and may have contributed to the drastic decline in applications over the first five years.

Florida's experience with DRI review highlights several features necessary for program effectiveness. The development categories should provide broad coverage of potential construction types, and should include public facilities in order to deal effectively with cumulative effects of small developments. Thresholds for the categories (or for a performance standard approach) should relate to characteristics of the site such as natural features, service capacity, or surrounding population density. It is also important to provide channels for amending the categories and thresholds, preferably avoiding prerequisite legislative approval.

The program's administrative structure should be kept simple, utilizing existing institutions to the maximum extent possible; however, as a qualified, independent adjudicatory board is absolutely necessary for effective program implementation, the desire to minimize bureaucratic costs should not preempt its establishment.

In establishing opportunities for balancing varied interests, development of regional benefit status should be available for use in combatting exclusionary local practices. It may also be desirable to specify in detail the concerns to be addressed regionally and locally, and to require written justifications of decisions made at these levels. Specification of access points for citizen recommendations at each of these governmental levels would also allow consideration of a wider variety of interests.

Finally, the DRI program should include a procedure for monitoring compliance with development conditions. At a minimum, spot-checks should be made in those localities and for those projects in which previous behavior foreshadows unsatisfactory local enforcement.

Establishing a DRI review program is a difficult political proposition. Obviously, this strategy will face strong opposition from development interests as well as from traditional champions of private property rights. In rapidly growing states, however, preservation of environmental quality also enjoys a large, politically effective constituency. This is particularly true in Sunbelt states with large resort and retirement communities.

Sponsors of DRI legislation need not rely totally on environmental protection arguments. The experience in Florida has shown that DRI is quality, rather than quantity, controlling and can be directed at improving the efficiency of energy use, assuring a sufficient housing supply, and balancing the demand for and capacity of public services. By exploiting the current interest in energy and government efficiency, as well as the more established environmental movement, generating the necessary political support for program adoption is quite conceivable.

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Elizabeth H. Ellis

The Small-City Taxi Industry: Policy Approaches for Preserving a Mobility Resource

One of the fundamental dilemmas facing planners today is knowing when the public sector should supplement or even replace the private sector as providers of certain essential human services. Whether the service is housing or health care, transportation or economic development, the problem is similar: the free market of private service providers at times does not--or cannot--provide essential services to all segments of the population. In many instances, this dilemma has led to an increased role of the public sector as a private provider.

GROWING ROLE OF THE PUBLIC SECTOR IN URBAN TRANSPORTATION

Nowhere is this dilemma more apparent than in the case of urban transportation. At one time, private transit operators were the rule rather than the exception. As late as 1959, 1173 of the 1225 transit systems in the United States were privately owned. Seventeen years later, the situation was reversed; only 580 of 955 transit systems were still in private ownership. In 1976, only 9% of all transit trips in the country were served by private transit operations (American Public Transit Association,1978).

What has happened to the transit industry is a story not unlike what has occurred in other service sectors. Basically, private transit operators could no longer achieve a profit in the free market. Higher personal incomes, higher auto ownership rates, and lower density land development have all contributed to lower transit ridership since World War II. Faced with these challenges, private transit operators responded by raising fares and decreasing service (and hence, costs) in an attempt to show a profit. The result, though, was decline of a once-healthy industry.

Two aspects of this decline deserve special attention. First, the private operators chose higher fares and less service, rather than innovative services, as their primary response to post-war conditions. Second, city after city purchased its transit system when faced with cessation of transit service. The Urban Mass Transportation Act of 1964, which provided funds for public take-overs, contains a section intended to protect the private operators. Yet this section has served to hasten the public take-overs of private operators as a way of "protecting" their rights.

Under public ownership, the transit industry is still far from profitable. In fact, the industry deficit in 1976 was $1.86 billion and growing at an alarming rate (American Public Transit Association, 1978). Confronted with ever-increasing costs, many transit systems are now coming full-circle and experimenting with contracts with private operators as a way to cut costs.

TAXIS FACE PROBLEMS OF THE PRIVATE TRANSIT INDUSTRY

Today the taxi industry seems to be following the path of the private transit industry. The taxi industry is still privately-owned and apparently strong. It carries twice as many passengers as all the urban rail systems and three-fourths as many as all the urban bus systems. It operates in more than 3500 cities

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and towns, over 2600 of which have no other form of public transportation. In North Carolina, 191 cities are served only by taxis (Garland, 1977).

Unfortunately, financial decay is now beginning to erode the taxi industry. A national survey of taxi operations found that one-half of the operations failed to generate revenues sufficient to cover operating and depreciation costs in 1975 (Wells, 1977). Likewise, the number of taxis is declining as more and more operations go bankrupt. In one attempt to combat this decline, taxi operators are pushing for rebates on state and federal motor fuel taxes. So far, North Carolina and seven other states have provided a fuel tax rebate. Beginning January 1, 1979, qualified taxicabs (those that carry nine or fewer passengers and permit shared-riding) have been eligible for rebates of the federal fuel tax.

The analogy between the taxi and transit industries is striking. Like the transit industries of the 1950s, taxi operators are raising fares in an attempt to offset costs. Also like their counterparts in the transit industry, the taxi operators are finding that higher fares are prohibitive to the low-income persons who depend on taxis. The request for public fuel tax relief, while in itself seemingly fair, reflects increasing government involvement and may eventually lead to public take-over of taxi systems.

"THE DECLINE OF THE TAXI INDUSTRY, AND ITS SIMILARITY TO THE DEMISE OF THE PRIVATE TRANSIT INDUSTRY, RAISES A NUMBER OF IMPORTANT POLICY ISSUES."

The decline of the taxi industry, and its similarity to the demise of the private transit industry, raises a number of important policy issues. The most pressing is the impact of taxi-system decline on smaller cities where taxis are the only form of public transportation. This article addresses some of these policy questions by examining the condition of the taxi industry in North Carolina and recent changes taking place in the industry. From this analysis, policy issues are addressed in an effort to show how local planners might respond to the current situation.

THE TAXI INDUSTRY IN NORTH CAROLINA

Taxi registration figures available from the North Carolina Division of Motor Vehicles show that a good proportion of the state enjoys taxi service. Eighty-seven of the 100 counties in the state had taxicab service in 1977, which represents about 30% of the total 508 cities and towns. Of the towns with populations less than 5,000, 26% have taxi service; in towns of 5,000 to 10,000 population, the percentage increases to 89%. All cities larger than 10,000 population have taxi service (Garland, 1977).

Many people prefer to use taxicabs rather than other forms of transit.

To examine the taxi industry in North Carolina more thoroughly, an extensive telephone survey of ninety-five cities and towns throughout the state was conducted in the spring of 1978. The telephone survey included all cities and towns with 1970 populations of 5,000 and over having taxi service, and a non-random sample of smaller towns which had taxi service in 1977. The information solicited included: the number of licensed cabs; the number of cabs actually operating; changes in the number of taxi firms in the last five years; changes in the number of taxicabs in the last five years; and any regulatory limits on the number of taxicabs allowed to operate. Taxi firms were not contacted directly as this would have been too expensive and time-consuming. Instead, the local taxi regulator or other knowledgeable city official was called. Police departments and city clerks were the most frequent sources of information.

SUPPLY OF TAXI SERVICE

The survey showed that the number of licensed cabs per city or town varies widely, from a low of one cab to a high of 153 cabs. The gross number of licensed cabs in a city does not, however, indicate the amount of taxicab service available. The most commonly used measure of such service is the ratio of population to taxis or taxi service. Figure 1 shows the ratio of taxis to population for five city-size classes. The ratios reveal a trend of increasingly larger ratios of persons to taxicabs with increasing city size. The smaller cities, particularly those with populations less than 10,000, have more taxi service available per capita than the larger cities,

FIGURE 1

PERSONS PER TAXICAB IN NORTH CAROLINA

City Population Category*	Number of Cities Contacted	Mean Persons Per Taxicab
under 5,000	27	1,070
5,000 to 10,000	26	1,036
10,000 to 25,000	23	1,171
25,000 to 50,000	9	1,408
over 50,000	10	1,421
Total of all Cities	95	1,154

*Based on 1977 population projections

especially those with populations of 25,000 and above. Even the high large-city ratios, however, are lower than those found in many U.S. cities, as shown in Figure 2. These data indicate that on the whole North Carolina cities and towns have greater taxi availability than a number of out-of-state areas.

All of the population-to-taxi ratios must, however, be interpreted with caution. First, the ratio may be unrealistically high, implying less taxi availability than is true, because the "official count" may underestimate the city's total number of operating cabs. Second, a ratio may be misleadingly low if the number of *licensed* cabs is used to calculate the ratio, as the number of licensed cabs is often higher than the number of operating cabs. A ratio may also be unrealistically low because the figure does not reflect the fact that much taxi service is supplied only part-time.

REGULATION OF TAXI SUPPLY

One reason for the trends shown in Figures 1 and 2 may be entry restrictions on the number of taxicabs allowed to operate within a city, These restrictions are said to produce a lower supply of cabs than would exist under free market entry, and much of the literature on taxicab supply has focused on the effects of entry restrictions.

Of the cities contacted in the North Carolina study, many regulators mentioned a specific entry limit but added that the effective limit depended upon the city council's assessment of the local need for taxi service. The entry restrictions varied considerably. Many of the smaller cities have no limits at all. In cities with populations of 10,000 to 25,000, there are some effective limits; in

"...ON THE WHOLE, NORTH CAROLINA CITIES AND TOWNS HAVE GREATER TAXI AVAILABILITY THAN A NUMBER OF OUT-OF-STATE AREAS."

Monroe, for example, the limit is thirty-five licenses, and a waiting list for licenses exists. In cities with populations over 25,000, it was not clear, in many cases, how elastic the limit is. Greensboro and Fayetteville, for example, recently raised their limits because of increasing city population.

It seems that while entry restrictions do suppress taxi supply in some North Carolina cities, the limits are not as fixed as in some of the nation's larger cities. The result contributes to the fact that cities and towns in North Carolina show greater taxi availability.

SIZE OF TAXI FIRMS

The majority of taxicab firms in North Carolina are quite small. When developing innovative services to help preserve this mobility resource, planners must remember that small-firm management is often very unsophisticated and few written records are kept. Additionally, many small-firm operators provide service only sporadically or in addition to a regular full-time job. If innovative taxi services are to be offered dependably and responsibly, the services must be tailored so that small-firm operators can provide them regularly; the operators must also be encouraged to change their attitudes and patterns of service delivery.

"WHEN DEVELOPING INNOVATIVE SERVICES... PLANNERS MUST REMEMBER THAT SMALL-FIRM MANAGEMENT IS OFTEN VERY UNSOPHISTICATED AND THAT FEW WRITTEN RECORDS ARE KEPT..."

Most available data on taxi-firm size are from nationwide surveys of large firms in large cities. One nationwide survey (Wells, 1975) showed that 33% of the nearly 700 firms surveyed operated twenty-five or more cabs; in a more recent survey (Wells, 1977), this figure increased to 40%. In contrast, only 3% of the approximately 546 firms identified in the North Carolina study operate twenty-five or more cabs. This represents only fourteen firms in the entire state. Moreover, approximately 90% of the North Carolina firms operate less than ten cabs. Wells' 1977 survey indicated that only 25% of the sampled firms nationwide operated less than ten cabs. The North Carolina study also examined the relationship between taxi-firm size and the population of a city. The finding, not surprisingly, was that the number of larger firms within a city tends to increase with city size.

The following picture of the taxi industry emerges from the North Carolina study: in the smaller cities with populations of less than 10,000, most taxi service is provided by single, independent owner-operators. In the medium-sized cities with populations of 10,000-50,000, the relative number of single owner-operators decreases, but the firms are nonetheless quite small; nearly 75% of the taxi firms in these cities operate four or fewer cabs. Even in the larger cities with populations of 50,000 or more, more than 50% of the firms operate four or fewer cabs, and approximately 25% more operate between five and fourteen cabs.

DECLINE OF THE TAXI INDUSTRY

Taxicabs traditionally have been applauded for their ability to make profits in the urban transportation business. However, rising costs and decreasing profits are changing this tradition. The International Taxicab Association's 1976 survey showed that about one-half of the taxi operators did not generate enough revenue in 1975 to cover operating and capital costs, and that about one-quarter did not even cover operating costs. The number of firms in

FIGURE 2
TAXICAB SUPPLY

Area	Sample	Population/Taxi	
		Median	Mean
Pennsylvania	29 cities	1,654	2,102
Illinois	6 counties	4,762	2,857
Wisconsin	13 urban areas	3,195	4,101
North Carolina	95 cities & towns	850	1,154

SOURCE: Brown 1973; Northeastern Illinois Planning Commission 1976; Wisconsin Department of Transportation 1976; Webster et al., 1974; Kirby et al., 1974.

the Association's file of taxi operations decreased 16% between 1974 and 1976 (Wells, 1977).

North Carolina taxi registrations data also show losses. In 1970, there were 3,296 taxis registered; by 1977, the figure had decreased to 2,541. In the year 1976 to 1977, the decline in taxi registrations represented almost a 9% loss in taxi service. In the same year, the number of cities with taxi service declined from 231 to 209. It was the smaller cities, with populations of 10,000 or less, that lost their taxi service.

"MANY USERS IN THE SMALLER CITIES HAVE NO ALTERNATIVE TO THE TAXICAB FOR TRANSPORATION."

Why are these declines occurring? From both national data and the North Carolina survey, it seems that rising operating costs are a primary cause. Increased fuel, maintenance, and insurance costs contribute to escalating operating costs. Taxi operators combat such rising costs with increased fares, which frequently produce ridership losses and exacerbate their financial difficulties Competition from other public transportation providers also cuts into taxi patronage. City bus systems, and more importantly demand-responsive transportation services designed for special target groups (such as the elderly or handicapped), often provide lower costs or even free transportation for former taxi riders.

USERS OF TAXI SERVICE

The characteristics of taxicab users are also important to transportation planners interested in preserving this mobility resource. Previous research in North Carolina revealed major differences between taxicab users in the large cities of the nation and those in smaller cities of the state (Gilbert et al., 1976). While taxis frequently are considered luxury goods in the larger U.S. cities, Gilbert et al. showed that small-city taxi users in North Carolina tend to be low-income, predominantly female, largely black, and without access to an automobile. Many users in the smaller cities have no alternative to the taxi for transportation. Even if alternative mass transit is available, taxi users rarely use transit. Most of these small-city users can truly be considered "taxi-dependent."

POLICY ISSUES

The character and current condition of the Noth Carolina taxi industry raise several policy issues. An important factor in policy discussions is that the taxi industry in smaller cities differs substantially from that in larger cities. Differences include the regulation of the number of taxis allowed to operate, the size structure of the firms, and the users of taxi service.

Regulation in most large cities nationwide includes a limit on the number of taxis, which restricts the supply of taxi service. In North Carolina, few cities have imposed strict numerical limits. Additionally, the size structure of North Carolina taxi firms is skewed toward small firms; the result is that North Carolina taxi firms are really a "mom-and-pop" industry. Finally, the predominant users of taxi service in the many small North Carolina cities are low-income and taxi-dependent. These users often have no other choice of transportation; taxi service for them is not a luxury good.

A more pressing policy issue, and one which should cause alarm among transportation planners in the state, is that this "mom-and-pop" industry is shrinking. Many North Carolina taxi operators function at exceedingly low overhead rates--sometimes without offices--and work long hours in order to make minimal wages. These operators tenuously survive in cities where no other unsubsidized local transportation provider remains. As these operators disappear, the many taxi-dependent persons in the smaller cities face increasing mobility problems.

While it is clear that small-city taxi operators are an important transportation resource, it is also clear that not all small-city taxi operations should be preserved. The lack of strict entry restrictions in most North Caro-

The public sector now operates most transit systems. Will the troubled taxicab industry require public take-over?

For a small firm, a single disabled taxicab can severely impair business.

lina cities, which effectively allows anyone to enter the taxi industry, has produced an oversupply of taxis in some areas. This fact is demonstrated in the comparatively low population-to-taxi ratios displayed by North Carolina cities and towns. Because of oversupply, some shrinkage in the taxi industry can be seen as a natural and desirable adjustment.

However, not all the current shrinkage can be viewed with such confidence. Small-city operators are definitely facing economic problems far in excess of mere rectification of oversupply. Since many small-city taxi users in North Carolina have low incomes, taxi fares cannot be raised high enough to recover increased operating costs (Gilbert et al., 1976). The result is an economic vise that seriously threatens the future of the small-city taxi industry.

How might transportation planners respond to this situation? In the case of the foundering private transit industry two decades ago, the public response led to subsidization and takeovers. Can this result be avoided in the case of the troubled small-city taxi industry? Are there better ways of helping taxis preserve mobility in small cities? The answer to both of these questions is yes.

"...IT IS ALSO CLEAR THAT NOT ALL SMALL-CITY TAXI OPERATIONS SHOULD BE PRESERVED."

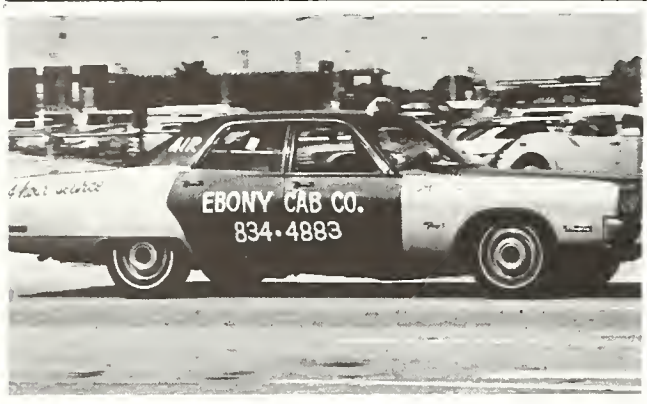
One such response would allow the market system to operate more freely and would permit the taxi operator to compete more fairly with competitors. Currently, the taxi operator's major competitors are publicly funded, human service programs that provide transportation for their clients. Over 100 federal agencies provide more than $10,000,000 per year for transportation in North Carolina (Garland, 1977). Such programs are well meaning and designed to serve needy groups; often, however, these efforts result in fragmentation and duplication of transportation services. Moreover, the programs not only siphon passengers from local taxi operators, but also receive heavy subsidies to compete with the taxis.

One way in which planners could improve this situation is by promoting coordination and fairness among various human service transportation programs. Fairness means that private taxi operators be given the opportunity to compete equally with human service transportation programs. One step toward fairness would be a "truth in transportation" policy whereby local providers--private and public--would be required to state the total, true costs of their services. The "truth in transportation" provision would include all public subsidies as actual costs. As a result, a public provider might well find that the total, true cost of its personnel time, maintenance, fuel, and other expenses would exceed the cost of contracting with a taxi operator to provide service.

"INSTEAD OF BEING A 'SUPPLIER' OF TRANSPORTATION, THE PLANNER SHOULD BE A FACILITATOR HELPING BOTH PRIVATE AND PUBLIC TRANSPORTATION PROVIDERS..."

A second planning response would be to update the local taxi ordinances. In North Carolina, as in most states, taxis are regulated locally. A recent review of local North Carolina taxi ordinances found the average ordinance was twenty-three years old (Bland, 1978). Much has happened in these twenty-three years to make the ordinances obsolete. At the very least, the ordinances should be revised to encourage shared-rides and other innovative services. Currently only two of the thirty-three local ordinances reviewed explicitly permit shared-ride service.

There is one other public policy response that would help preserve local mobility: new funding mechanisms. In assisting the transit industry, public funds went directly to the providers--the publicly-owned transit systems. An alternative is to assist the passengers directly. This concept, called a user-side subsidy, has the advantage of simplicity and leaves the taxi industry in the private sector. Projects in Macon County and Kinston, North Carolina currently employ user-side subsidies.



Taxicabs are often the only form of public transportation available in small cities.

CONCLUSION

The precarious financial condition of the small-city taxi operator poses a real threat to the mobility of many taxi-dependent persons. This article has suggested ways in which the small-city taxi industry in North Carolina might be assisted without public ownership resulting. The suggestions may also be useful to transportation planners in other small-to-medium-sized Southeastern cities facing similar declines in their taxi industries. What these recommendations also imply is a new role for transportation planners. Instead of simply focusing on public programs and public provision of transportation services, the planner should be more aware of, and sensitive to, private sector providers. Instead of being a "supplier" of transportation, the planner should be a facilitator helping both private and public transportation providers operate cooperatively and more efficiently.

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